GEFRAN

GCube Fit
Custom Machine Controller

INSTALLATION AND USER MANUAL

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PREFACE

Warnings and safety

While all the information contained in this manual has been carefully checked, Gefran S.p.A. accepts no responsibility for the possible presence of errors or for damage to persons and/or property caused by the improper use of the manual. Gefran S.p.A. also reserves the right to make changes to the contents and form of this manual and to the characteristics of the devices illustrated at any time and without prior warning.

The installation of the devices illustrated in the manual must be carried out by qualified technicians in compliance with the laws and standards in force and in agreement with the instructions contained in the manual.

If the GCube Fit system is used in applications with the risk of damages to persons, machinery or materials, its use in conjunction with alarms is essential.
It is advisable to envisage the possibility of checking the intervention of the alarms during regular operation.

Before interacting with the Controller and built-in Operator Panel, the operator must receive full training in the procedures of operation, emergency, diagnosis and maintenance of the system.

Printing conventions used in the manual

Pay attention to the use of the following symbols.

Highlights particularly important information which influences the correct operation of the product or of safety or an instruction which must absolutely be followed.

Highlights a risk condition for the safety of the installer or the user, due to the presence of dangerous levels of voltage.

Glossary

CAN Controller Area Network, also known as CAN-bus, is a standardised bus that enables the devices to communicate with each other.

CANopen CAN communication protocol. Protocol specification for devices used in automation systems.

Work cycle Fraction of time that represents the active state of a device, circuit, etc. in relation to the total time considered.

Data logger Enables the storage of information for filing records or further processing.

Duration of settlement Time required for the output value to reach and remain above 90 % of the final value.

Encoder Rotative position transducer.

Electric resistance extensometer Sensor that transforms small dimensional deformations of a body subject to mechanical or thermal stress in changes of electric.

Ethernet Standard for local networks (LAN).

FLASH Non-volatile memory in the solid state.

FRAM Non-volatile RAM faster than the Flash memory.

FTP File Transfer Protocol. Allows the upload and download of data files between the controller and other digital devices.

LSB Least Significant Bit. It defines the minimum resolution of a measurement.

LSS Layer Setting Services.

Modbus Open serial communication protocol, de facto standard in communication between industrial electronic devices. Modbus RTU is the most common implementation of this standard, Modbus TCP/IP is that specific m for Ethernet networks.

Opto isolated Circuit configuration which, through an electronic component called an optoisolator, allows the transferral of a signal between two circuits while maintaining galvanic separation.

PID Regulation algorithm.

PLC Programmable Logic Controller. A digital computer specialised in the management of industrial processes.

PWM Pulse-Width Modulation. Technique for controlling power towards electric devices.

RAM Random Access Memory Electronic memorising device which enables the reading and writing of data.

RS-232 Standard which defines a low-speed serial transmission interface for the exchange of data between digital devices, such as modems.

RS-485 Standard, at physical level, for serial connection with 2 wires.

SD Card Card for memorising large amounts of digital data.

SDRAM Synchronised access RAM.

Strain gauge See *Electric resistance extensometer*.

USB Universal Serial Bus, serial communication and feeding standard created to connect peripherals to computers.

Overview of the solution and functionalities

GCube Fit is the complete process and automation control solution, which allows sequence control, process management, programming and display of data and connectivity with a single modular system.
To this end, a combination of “technological functions”, such as the management of PWM, fast counters, data filing by data logger, temperature PID, data export via FTP, enabling the rapid creation of applications, is made available..

GCube Fit consists of two or more modules linked via CANopen with DS301 v4.02 profile: the Controller and Operator Panel integrated into a single device, complete with PLC embedded run time, available with a 3.5” or 7” wide display (the latter in either a horizontal or vertical version), and the IO Remote module for the management
of remote inputs and outputs, which can be completely customised to suit customer requirements, adapting perfectly to the machine or system to control.

Thanks to its flexibility and ease of use, GCube Fit can be used in a variety of sectors and for numerous process and automation process controls, such as:

- the wood industry (gluing, etc.);
- packaging (packing, labelling, etc.);
- food industry (pasteurisers, etc.);
- chemical industry (autoclaves, etc.);
- metal working (washing, etc.);
- plastic working (dryers, coolers, etc.).

Architecture

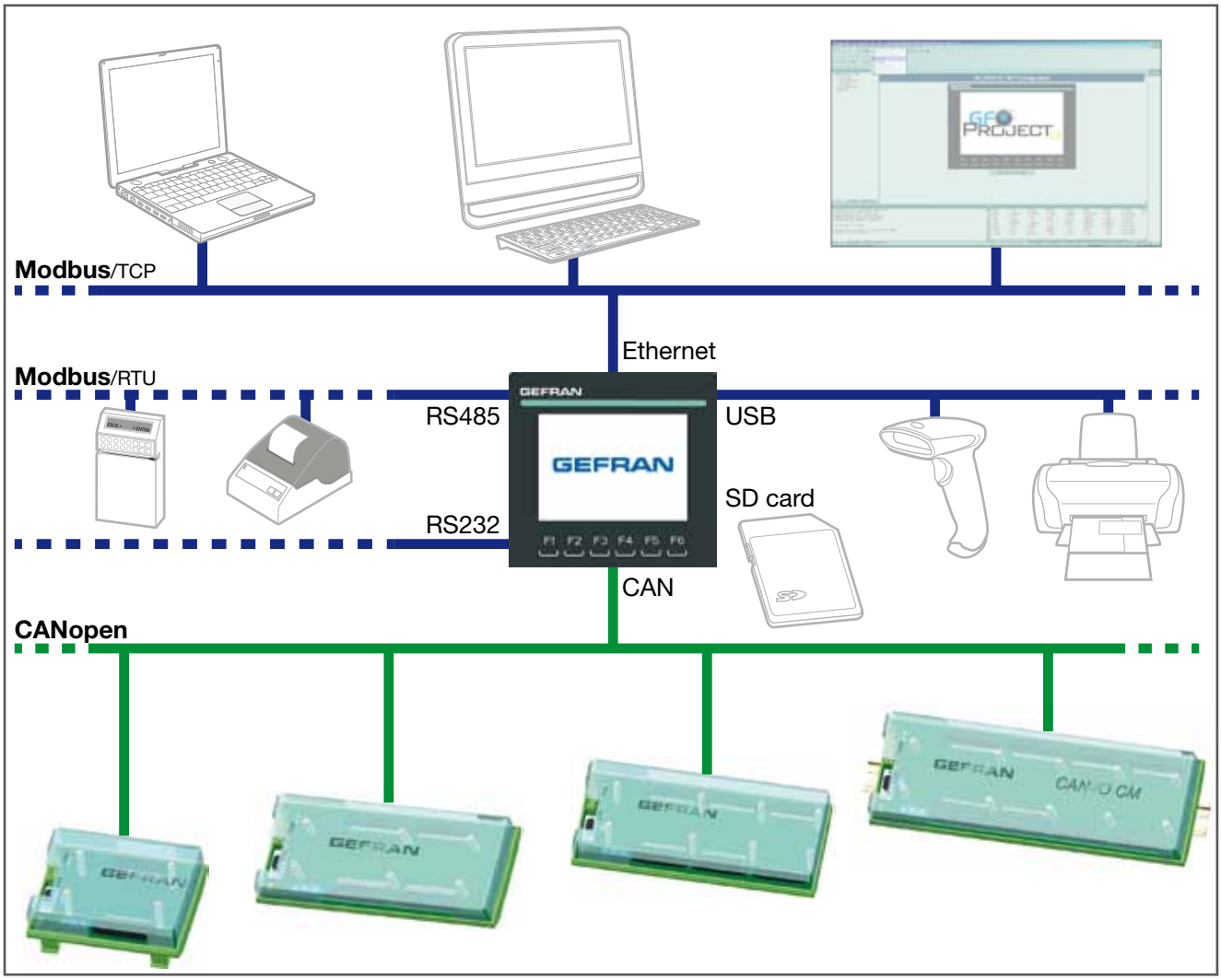
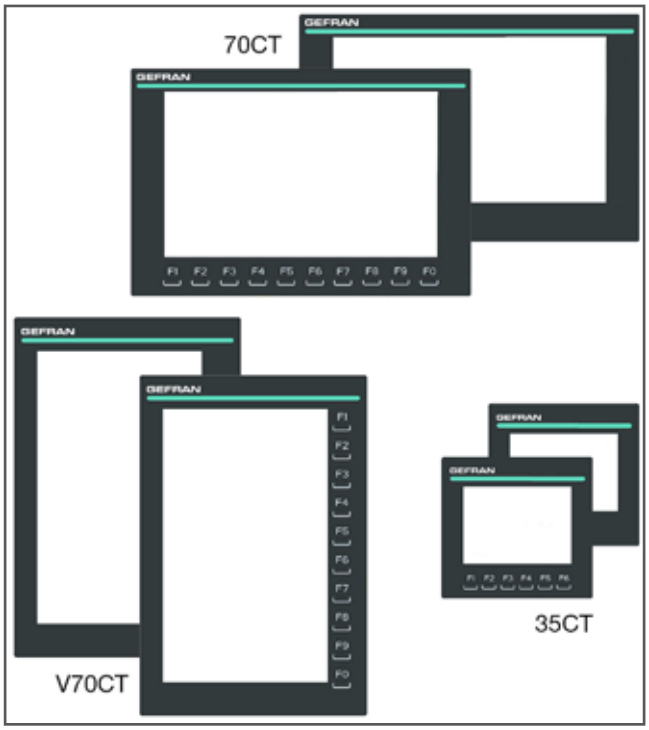


Figure 1 - System architecture

GF_VEDO series SL models 35CT – 70CT – V70CT



The integrated Controller and Operator Panel allows the complete management of automation.
Available in 3 versions (6 models), and equipped with a powerful 400 MHz processor.
It is destined mainly to operate in an industrial environment on the control panels of production process machines or processes.

The operator interacts through a colour touch screen.
Depending on the model, the size of the screen is 3.5" or 7" wide.
As an option, the device can be equipped with programmable function buttons.

Thanks to its numerous communication ports (some of which are optional), it is possible to connect a wide range of devices to the controller, such as computers, barcode readers, USB sticks, modems, printers, etc., and connect it to an Ethernet network.

The remote input and output modules (CAN-IO) are connected by bus to the CAN port (CANopen).
Other CANopen standard compliant devices can also be connected to the bus.

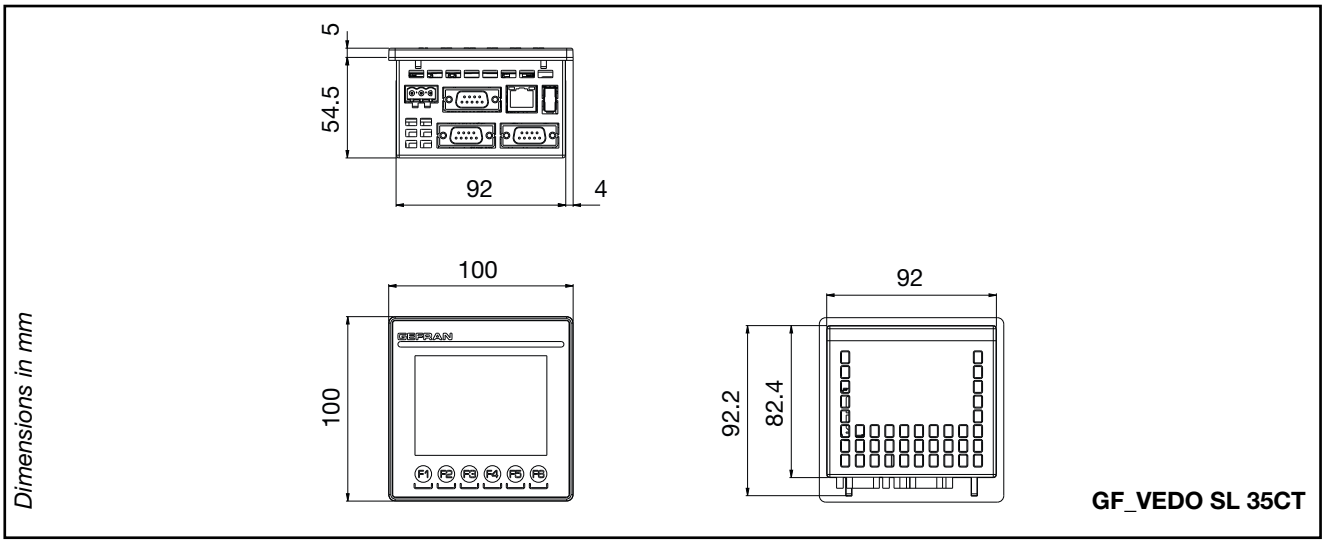
Technical data

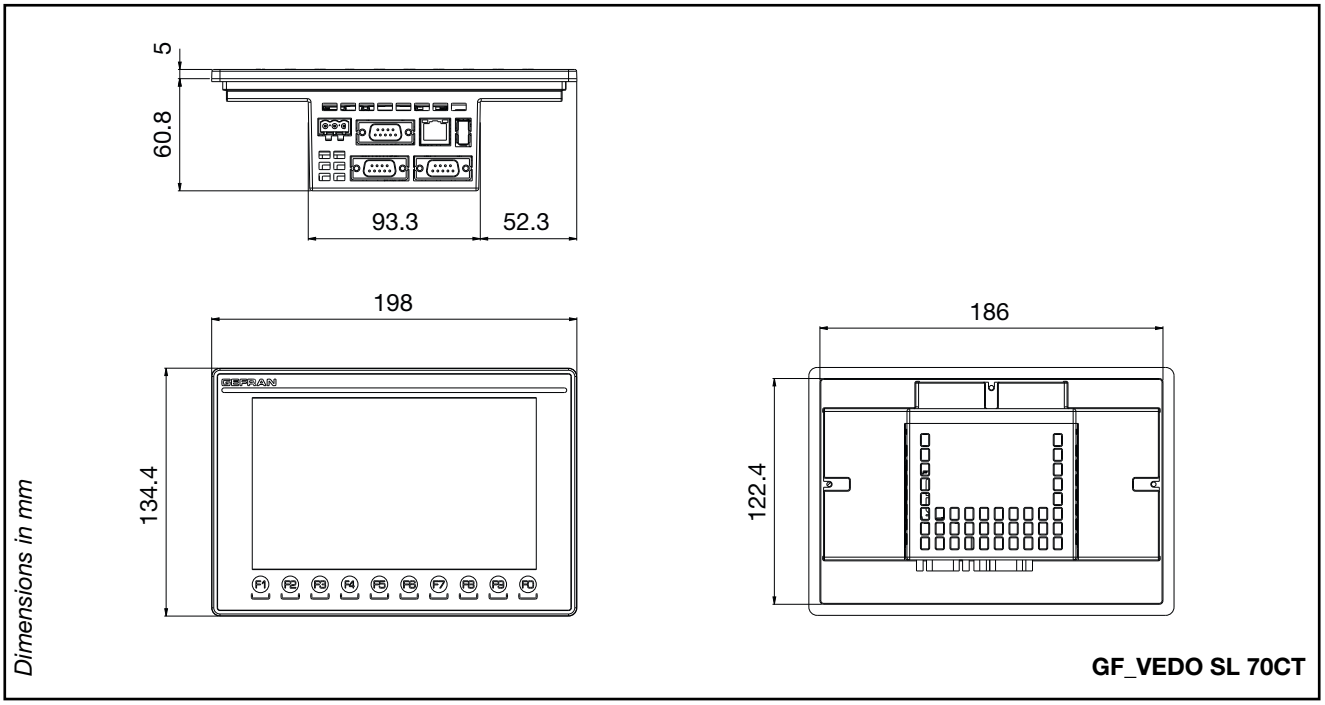
		35CT	70CT – V70CT
POWER	Operating voltage	24 Vdc ±25%	
	Absorbed current (at 24 Vdc)	300 mA max	350 mA max
	Dissipated power	7,5 W max	8,5 W max
	Protections	Protection for polarity inversion Short circuit	
	Connection	3-pole polarised extractable connector Screw terminals, max wire section 2,5 mm^2	
BACK-UP BATTERY	Type	Rechargeable Li-Al 3 V 65 mA/h, type ML2032, non-replaceable	
	Duration	10 years in absence of power: 20 months	
CONNECTIONS	CAN Port	Opto-isolated Connector: DB9 M Speed: 10 kbit/s … 1 Mbit/s Termination: to be managed externally	
	Ethernet (ETH) Port	Connector: RJ45 Speed: 10 / 100 Mbit/s Signals: green connection LED, yellow data LED	
	RS-485 Port (optional)	Opto-isolated Connector: DB9 M Speed: 9,6 kbit/s … 115 kbit/s	
	RS-232 Port (optional)	Connector: DB9 M Speed: 9,6 kbit/s … 115 kbit/s	
	USB Port (optional)	Connector: type A Standard: USB 2.0	

		35CT	70CT – V70CT
COMMUNICATION PROTOCOLS	Ethernet	FTP (File Transfer Protocol) Modbus TCP/IP Master/Slave	
	CAN	CANopen Master	
	Modbus	Modbus RTU Master/Slave	
DISPLAY	Type	TFT touch screen with 4-wires resistive technology	
	Dimensions (diagonal)	3,5”	7”
	Resolution in pixels	320 x 240 (QVGA)	70CT: 800 x 480 (WVGA) V70CT: 480 x 800
	Display area (L x H)	70 x 52,5 mm	70CT: 152,4 x 91,4 mm V70CT: 91,4 x 152,4 mm
	Colours	262.000	
	Brightness	400 cd/m^2	240 cd/m^2
	Contrast	400:1	1000:1
	Backlighting	White LEDs, duration 50.000 hours @ 25 °C	
	Visual angle	Horizontal: 60° Vertical: 45°-60°	70CT and V70CT: 85° in all directions
CONFIGURATION ELEMENTS	Procedure software access	16-position dial	
CONTROL ELEMENTS	Keypad (optional)	6 programmable function buttons	10 programmable function buttons
MICROPROCESSOR	Type	ARM9	
	Frequency	400MHz	
MEMORY	Sistem	64 MB, tipo SDRAM • 12 MB HMI application • 2,5 MB PLC applicative	
	Retentive	• 32 kB retentive variables (FLASH / FRAM *) • 1 MB data logger (FLASH)	
	Mass	128 MB, type FLASH • 32 MB for user	
	Mass extension	Slot SD Card (optional) *	
ENVIRONMENTAL CONDITIONS	Operating temperature	0 ... +50 °C (according to IEC 68-2-14)	
	Storage temperature	-20 ... +70 °C (according to IEC 68-2-14)	
	Relative humidity	max 95% RH non condensing (according to IEC 68-2-3)	
ASSEMBLY		Embedded, in control panels	
DEGREE OF PROTECTION		IP 65 on the front (according to IEC 68-2-3)	
WEIGHT		0,25 kg	0,5 kg
CE STANDARDS	EMC conformity (electromagnetic compatibility)	Observance of Directive 2004/108/CE EMC Emission: EN 61000-6-4 EMC Immunity EMC: EN 61131-2, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11	
	LV conformity (low voltage)	Observance of 2006/95/CE Safety LVD: EN 61010-1	

* Available from January 2013

Dimensions and spaces required for installation





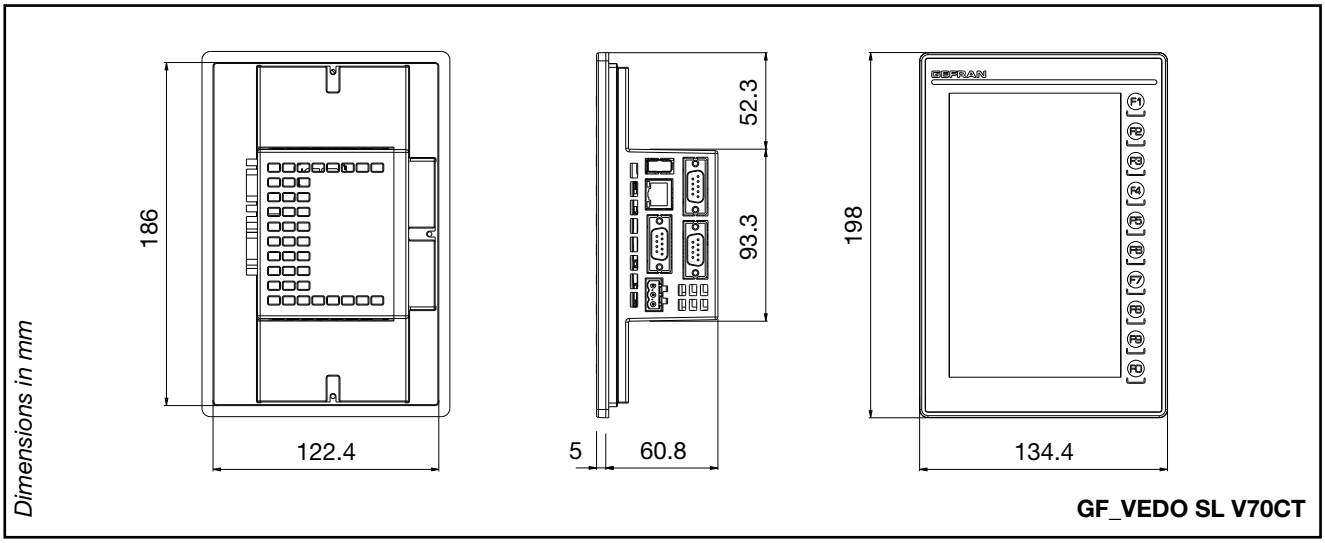


Figure 2 - Dimensions GF_VEDO SL

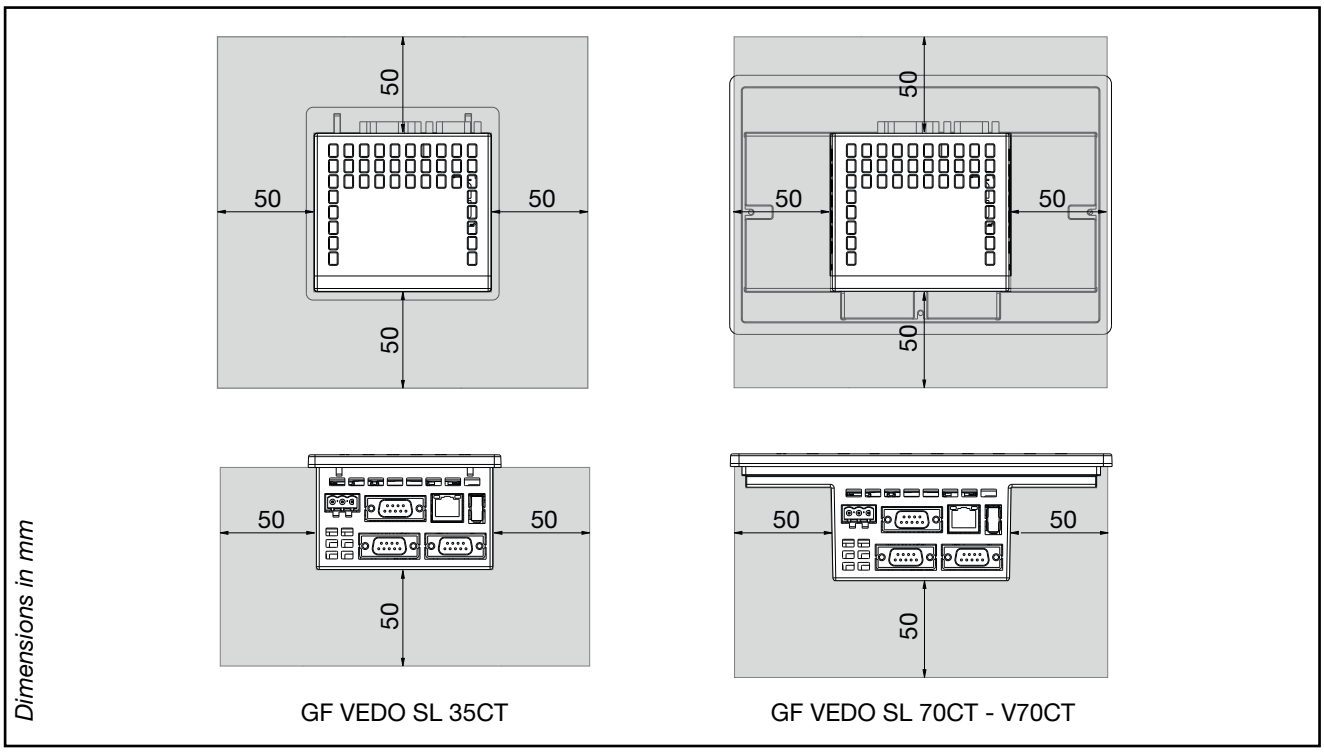
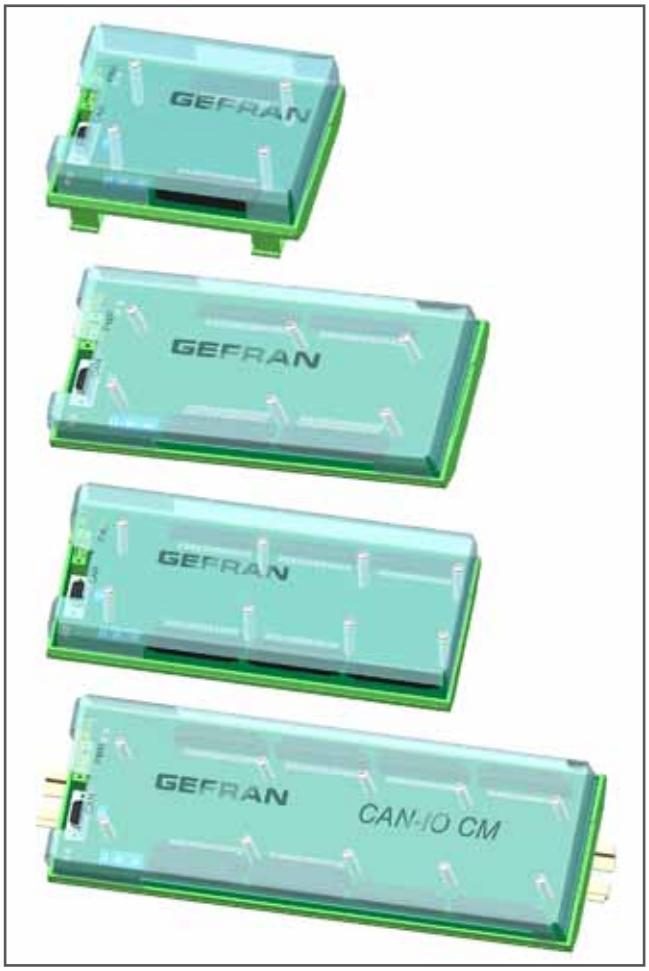


Figure 3 - Free spaces for ventilation

Attention: the temperature inside the compartment that houses the integrated Controller and Operator Panel must never exceed 50 °C.

The free spaces highlighted in grey are those recommended with static ventilation.
With forced ventilation these spaces can be reduced even further.

CAN-IO



The remote input and output module (I/O) allows:

- acquisition of multiple information for the appliances controlled and from the environment, via signals and sensors;
- control and regulate appliances through different types of signals and commands.

The modules are available in different models and can manage up to a total of 40 channels (inputs and outputs) each, with the following limits type (see ordering codes):

- digital inputs: 24 max;
- fast digital inputs (meters): 6 max;
- digital outputs: 16 max in total (outputs 0.5 A: 16 max;
- outputs 2 A: 16 max; relay outputs: 8 max);
- PWM outputs: 8 max;
- Temperature inputs (thermocouples, thermo resistance PT100, thermo resistance PT1000): 10 max in total;
- analogue inputs (power input ±10 V, current input 0/4…20 mA, extensometer input, potentiometer input): 8 max in total;
- analogue outputs (power outputs ±10 V, current outputs 0/4…20 mA): 8 max in total.

The main characteristic of the module is that it is assembled according to user requirements, combining different type inputs and outputs on the same card, in the quantities required.
In this way they adapt perfectly to the requirements of the machine or system to be controlled.

The modules can be prepared for assembly on DIN runner or plate, according to requirements.

Technical data

POWER	Operating voltage	24 Vdc ±25%
	Absorbed current (at 24 Vdc)	700 mA max
	Dissipated power	12 W max
	Connections	Screw terminals, max wire section 1 mm^2
CONNECTIONS	CAN Port	Opto-isolated DB9 M: Connector
	I/O Ports	Connectors depending on the configuration. Type 1: screw terminals, max wire section 1 mm2; for relay max wire section 2.5 mm2 Type 2: click-in, female, 12-pole Type 3: comb
COMMUNICATION PROTOCOLS	CAN	CANopen (NMT slave) Version: communication profile DS301 v. 4.02 device profile DS401
	Module addresses available	128
	Transmission speed	10, 20, 50, 100, 125, 250, 500 (predefined), 800, 1000 kbit/s, selectable via hardware or software

DISPLAY LED	Card	1 yellow “Power” LED 1 green “Run” LED
	Bus CAN	1 green “Run” LED 1 red “Run” LED
	Digital input	1 green “Status” LED
	Digital output	1 green “Status” LED Output 0.5 A: yellow “Power” LED every 8 outputs; Output 2 A: yellow “Power” LED every 4 outputs
	Fast counter	1 green “Status” LED
	Relay output	1 green “Status” LED
	PWM output	1 green “Status” LED 1 yellow “Power” LED every 8 outputs
CAN PROTOCOL	Module address configuration	1 switch + 2 16-position dials
	Transmission speed configuration	Via procedure with module address dials or via software
	Bus termination configuration	2 switch
DIGITAL INPUT	Max number	24 (orderable in groups: 3, 6, 9, 12, 15, 18, 21, 24)
	Type	Absorption of current type 1, 2, 3
	Rated voltage	24 Vdc
	Max input voltage	32 Vdc
	Max input current	6.5 mA
	Switch threshold	Low level: ≤ 8 Vdc High level: ≥ 9 Vdc
	Hardware filter	100 Hz
	Switch delay	0 -> 1: 100 µs 1 -> 0: 85 µs
	Protections	Polarity inversion Overvoltage: max 1 kV per 1 ms
	Electric insulation	Channel-channel: no Channel-bus: 2 kV
FAST DIGITAL INPUT	Max number	6 (orderable in groups: 3, 6)
	Type	Absorption of current type 1, 2, 3
	Rated voltage	24 Vdc
	Max input voltage	32 Vdc
	Max input current	6,5 mA
	Switch threshold	Low level: ≤ 8 Vdc High level: ≥ 9 Vdc
	Hardware filter	50 kHz
	Switch delay	0 ⇒ 1: < 500 ns 1 ⇒ 0: < 500 ns
	Position / counter output format	Type: DINT Resolution: 32 bit (-2147483648 ... 2147483647
	Speed output format	Type: DINT Resolution: 32 bit (-2147483648 ... 2147483647) LSB: 0.1 impulses/s
	Period measurer / impulse duration measurer output format	Type: DINT Resolution: 32 bit (0 ... 21,4 s) LSB: 10 ns

FAST DIGITAL INPUT	Frequency measurer output format	TYPE: DINT Resolution: 32 bit (0 ... 500 kHz) LSB: 0,1 Hz
	Protections	Polarity inversion Overvoltage: max 1 kV per 1 ms
	Electric insulation	Channel-channel: no Channel-bus: 2 kV
	Main functions	6 one-way incremental encoders [A] max; 2 one-way incremental encoders + zero notch [A+Z] max; 2 two-way incremental encoders [AB] max; 2 two-way incremental encoders + zero notch [AB+Z] max; Max 6 count forward [Counter]
	Auxiliary functions	Period measurer Frequency measurer Duty-cycle measurer Positive/negative impulse measurer
THERMOCOUPLE TEMPERATURE INPUT	Max number	10 (orderable in groups: 2, 4, 6, 8, 10)
	Type	Thermocouple J, K, R, S, T, E, B, L, N
	Type of connection	2 wires (insulated and non-insulated)
	Through band	0,5 Hz
	Input impedance	> 1 MΩ
	Sampling time (for all channels)	100 ms
	Resolution	0,1 °C / °F
	Max error @ 25 °C	±0,5% scale bottom
	Thermocouple use interval (scale)	J: 0 … 1000 °C / 32 … 1830 °F K: 0 … 1300 °C / 32 … 2372 °F R: 0 … 1750 °C / 32 … 3182 °F S: 0 … 1750 °C / 32 … 3182 °F T: -200 … 400 °C / -392 … 752 °F E: -100 … 750 °C / -212 … 1382 °F B: 0 … 1820 °C / 32 … 3308 °F L: -200 … 400 °C / -392 … 752 °F N: 0 … 1300 °C / 32 … 2372 °F
THERMO RESISTANCE TEMPERATURE INPUT	Max number	10 (orderable in groups: 2, 4, 6, 8, 10)
	Type	Thermo resistance PT100 or PT1000
	Type of connection	2 or 3 wires
	Through band	0,5 Hz
	Input impedance	PT100: 12 kΩ PT1000: 120 kΩ
	Sampling time (for all channels)	100 ms
	Resolution	0,1 °C / °F
	Max Error @ 25 °C	±0,5% scale bottom
	Use interval (scale)	-200…850 °C / -392…1562 °F
	Protections	Polarity inversion: yes Overvoltage: max 1 kV per 1 ms
	Electric insulation	Channel-channel: no Channel-bus: 2 kV

ANALOGUE INPUT IN VOLTAGE ±10 V	Max number	8 (orderable in groups: 2, 4, 6, 8)
	Type	Single-ended voltage ±10 V
	Input filter	Low-pass, 3rd order Cutting frequency: 20 Hz
	Input impedance	> 1 MΩ
	Sampling time (for all channels)	5 ms
	Output format	Type: INT Resolution: 13 bit (-4096 … 4095) LSB: 2,44 mV
	Max error @ 25 °C	±0,5% scale bottom
	Protections	Polarity inversion: yes Overvoltage: max 1 kV per 1 ms
	Electric insulation	Channel-channel: no Channel-bus: 2 kV
ANALOGUE INPUT IN CURRENT 0/4 … 20 mA	Max number	8 (orderable in groups: 2, 4, 6, 8)
	Type	Current 0 ... 20 mA
	Input filter	Low-pass, 3rd order Cutting frequency: 20 Hz
	Input impedance	100 Ω
	Sampling time (for all channels)	5 ms
	Output format	Type: UINT Resolution: 14 bit (0 … 20 mA: 0 … 16384 4 … 20 mA: 3277 … 16384) LSB: 4,88 µA
	Max error @ 25 °C	±0,5% fondo scala
	Protections	Polarity inversion: yes Overvoltage: max 1 kV per 1 ms
	Electric insulation	Channel-channel: no Channel-bus: 2 kV
POTENTIOMETER ANALOGUE INPUT	Max number	8 (orderable in groups: 2, 4, 6, 8)
	Type	Potentiometer 2 kΩ min.
	Transducer power	5 V, 150 mA max
	Input filter	Low-pass, 3rd order Cutting frequency: 20 Hz
	Input impedance	> 1 MΩ
	Sampling time (for all channels)	5 ms
	Output format	Type: UINT Resolution: 12 bit LSB: 1,22 mV
	Max error @ 25 °C	±0,5% scale bottom
	Protections	Polarity inversion: yes Overvoltage: max 1 kV per 1 ms
	Electric insulation	Channel-channel: no Channel-bus: 2 kV

ELECTRIC RESISTANCE EXTENSOMETER ANALOGUE INPUT (“strain gauge”)	Max number	8 (orderable in groups: 2, 4, 6, 8)
	Type	Differential, strain gauge, 2,2 mV/V, 3,3 mV/V
	Transducer power	5 V, 150 mA max
	Input filter	Low-pass, 2nd order Cutting frequency: 20 Hz
	Input impedance	> 1 MΩ
	Sampling time (for all channels)	5 ms
	Output format	Type: UINT Resolution: 16 bit LSB: 0,38 µV
	Errore max @ 25 °C	±0,5% scale bottom
	Protections	Polarity inversion: yes Overvoltage: max 1 kV per 1 ms
	Electric insulation	Channel-channel: no Channel-bus: 2 kV
DIGITAL OUTPUT 0,5 A	Max number	16 (orderable in groups: 2, 4, 6, 8, 10, 12, 14, 16)
	Composition	Current emission
	Type	24 Vdc ±25%
	Rated voltage	Single output: 0.5 A Group of 8 outputs: 4 A
	Max output current	0 ⇒ 1: 30 µs 1 ⇒ 0: 50 µs
	Switch delay	Short circuit Overload : I ≥ 0.7 A (according to IEC 61131-2) Overtemperature Overvoltage: max 1 kV per 1 ms
	Protections	Corto circuito Sovraccarico: I ≥ 0,7 A (secondo IEC 61131-2) Sovratemperatura Sovratensione: max 1 kV per 1 ms
	Electric insulation	Channel-channel: no Channel-bus: 2 kV
DIGITAL OUTPUT 2 A	Max number	16 (orderable in groups: 2, 4, 6, 8, 10, 12, 14, 16)
	Composition	Every 4 outputs a power wire
	Type	Current emission
	Rated voltage	24 Vdc ±25%
	Max output current	Single output: 2 A Group of 4 outputs: 8 A
	Switch delay	0 ⇒ 1: 20 µs 1 ⇒ 0: 50 µs
	Protections	Short circuit Overload: I ≥ 2,7 A (according to IEC 61131-2) Overtemperature Overvoltage: max 1 kV per 1 ms
	Electric insulation	Channel-channel: no Channel-bus: 2 kV

RELAY OUTPUT, SINGLE CONTACT	Max number	8 (orderable in groups: 2, 4, 6, 8)
	Type	Single N.O. contact
	Rated voltage	30 Vdc / 250 Vac
	Max current	5 A
	Mechanical duration	20 x 10^6 operations
	Contact duration	70.000 operations
	Protections	Overvoltage: max 430 V @ 1 mA
	Electric insulation	Channel-channel: yes Channel-bus: 3 kVrms
RELAY OUTPUT, EXCHANGE CONTACT	Max number	4 (orderable in groups: 2, 4)
	Type	exchange contact N.O., N.C.
	Rated voltage	30 Vdc / 250 Vac
	Max current	5 A
	Mechanical duration	20 x 10^6 operations
	Contact duration	2 A: 300.000 operations 5 A: 70.000 operations
	Protection	Overpressure: max 430 V @ 1 mA
	Electric insulation	Channel-channel: yes Channel-bus: 3 kVrms
PWM OUTPUT	Max number	8 (orderable in groups: 2, 4, 6, 8)
	Composition	Every 8 outputs a power wire
	Type	Current emission
	Rated voltage	25 Vdc ±25%
	Max output current	Single output: 1 A Group of 8 outputs: 8 A
	Output configuration	PWM Frequency
	PWM output	Duty cycle: resolution 0.01% Frequency: resolution 0.01 Hz Max frequency: 5 kHz
	Frequency output	Duty cycle: resolution 50% Frequency: resolution 0.01 Hz Max frequency: 50 kHz
	Output format	Type: INT Resolution: 13 bit (-4096 … 4095) LSB: 2,44 mV
	Switch delay	0 ⇒ 1: 1,5 µs 1 ⇒ 0: 1 µs
	Protections	Short circuit Overload : I ≥ 1.4 A Overtemperature Overvoltage: max 1 kV per 1 ms
	Electric insulation	Channel-channel: no Channel-bus: 2 kV

ANALOGUE OUTPUT VOLTAGE ±10 V	Max number	8 (orderable in groups: 2, 4, 6, 8)
	Type	Single ended voltage ±10 V
	Max output current	20 mA
	Refreshing time	10 ms
	Settling time (“settling time”)	1 ms
	Output format	Type: INT Resolution: 13 bit (-4096 … 4095) LSB: 2,44 mV
	Max error @ 25 °C	±0,5% scale bottom
	Protections	Short circuit ±10V: yes Overpressure: max 1 kV per 1 ms
	Electric insulation	Channel-channel: no Channel-bus: 2 kV
ANALOGUE OUTPUT CURRENT 0/4 ... 20 mA	Max number	8 (orderable in groups: 2, 4, 6, 8)
	Type	Corrente, 0 ... 20 mA
	Max voltage	12 V
	Max charge	600 Ω
	Refreshing time	5 ms
	Settling time (“setting time”)	1 ms
	Output format	Tipo: UINT Resolution: 12 bit (0 … 20 mA: 0 … 16384 4 … 20 mA: 3277 … 16384) LSB: 1,22 µA
	Max error @ 25 °C	±0,5% scale bottom
	Protections	Overvoltage: max 1 kV per 1 ms
	Electric insulation	Channel-channel: no Channel-bus: 2 kV
ENVIRONMENTAL CONDITIONS	Operating temperature	0 ... +50 °C (according to IEC 68-2-14)
	Storage temperature	-20 ... +70 °C (according to IEC 68-2-14)
	Relative humidity	5 ... 95% RH non-condensing (in according to IEC 68-2-3)
ASSEMBLY		Direct on plate, with spacers On 35 mm DIN bar, horizontal or vertical (optional)
DEGREE OF PROTECTION		IP 20 (optional)
WEIGHT		Depending on the I/O configuration For assembly on plate: 0.6 kg max For assembly on DIN runner: 0,85 kg max
CERTIFICATION		CE UL by specific request
CE STANDARDS	EMC conformity (electromagnetic compatibility)	Observance of Directive 2004/108/CE
	LV conformity (low voltage)	Observance of Directive 2006/95/CE

Dimensions

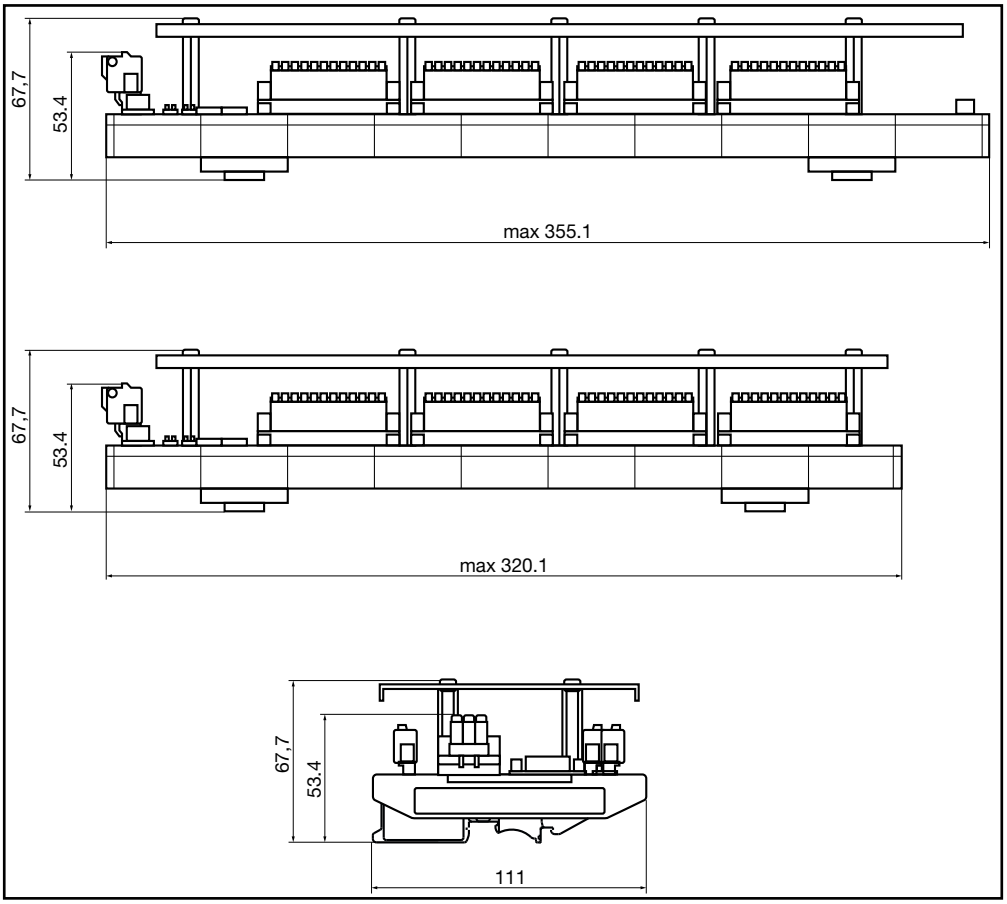


Figure 4 - Dimensions CAN-IO, versions for assembly on DIN runner

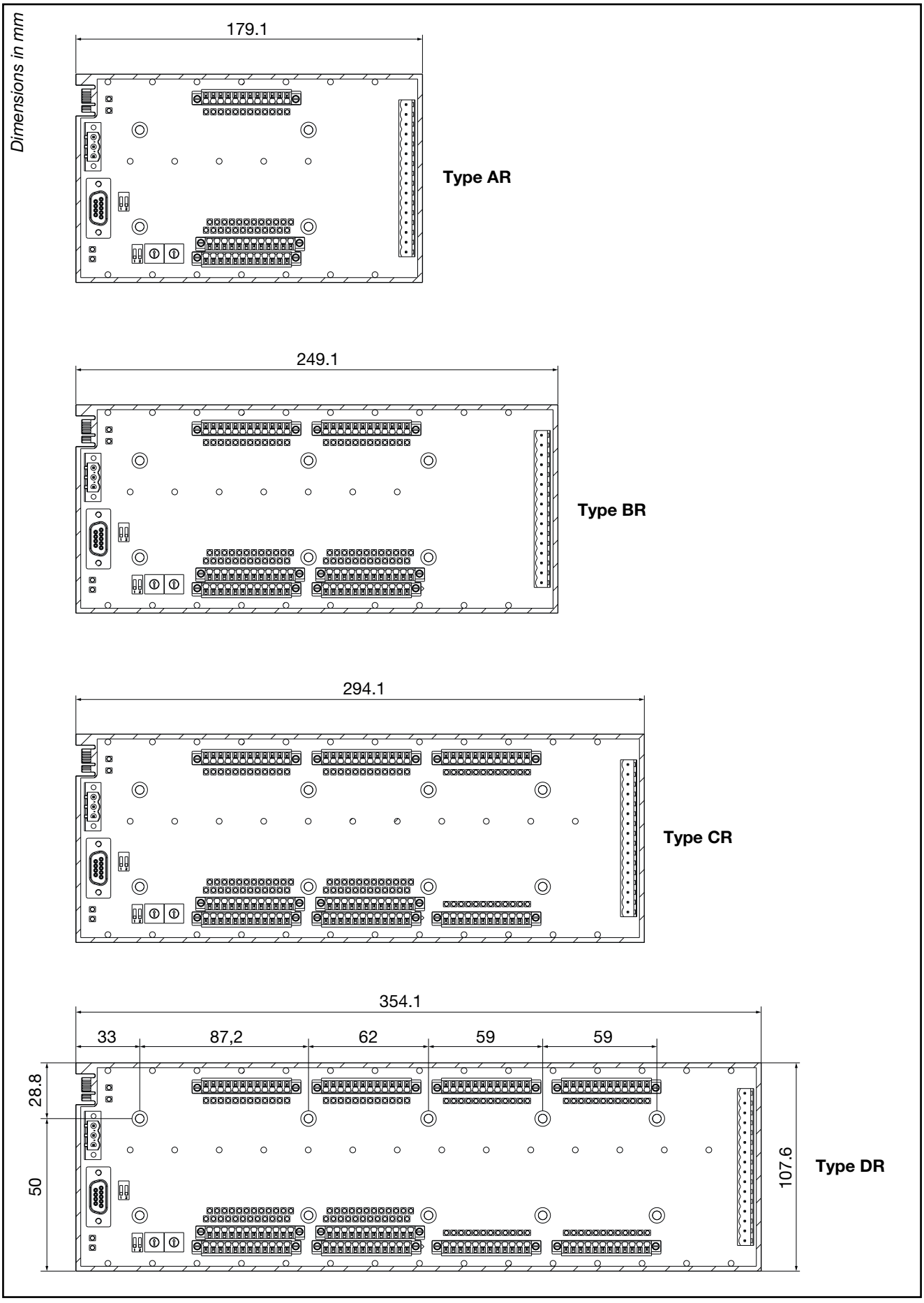


Figure 5 - Dimensions, versions for assembly on plate, with relay

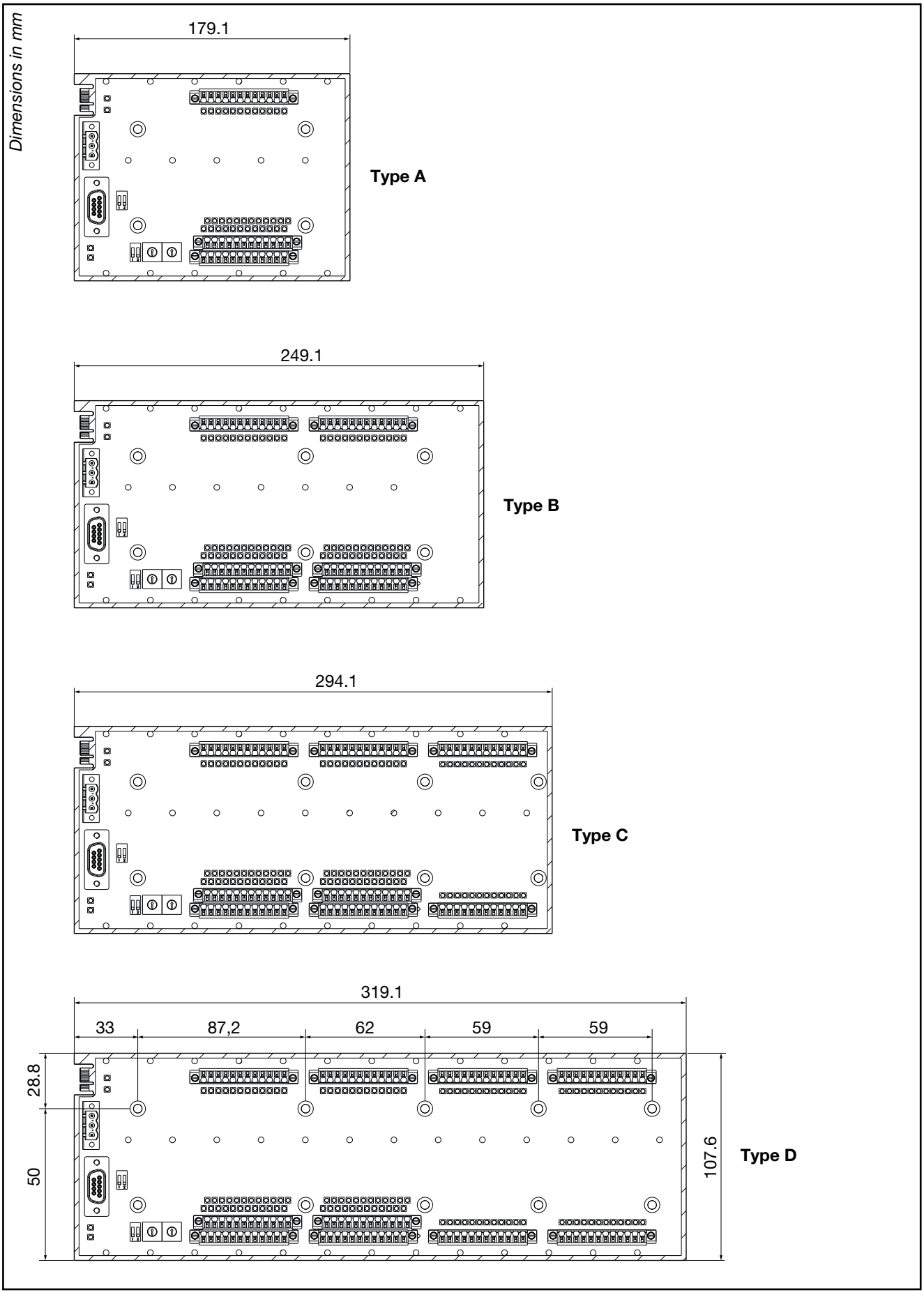


Figure 6 - CAN-IO, dimensions, versions for assembly on plate, without relay

Assembly of Integrated Controller and Operator Panel

Hole dimensions

For correct installation, observe the dimensions of the templates shown in the illustration.
The dotted line shows the maximum size of the front panel.

Attention: the panel on which the Integrated Controller and Operator Panel is mounted has to have the following characteristics:

- be sufficiently stiff and strong so that it does not bend during use;
- be between 1 and 12 mm thick, to allow the fastening of the device with the terminals supplied;
- if the use of the USB transfer cable is envisaged, read the notes on its installation first.

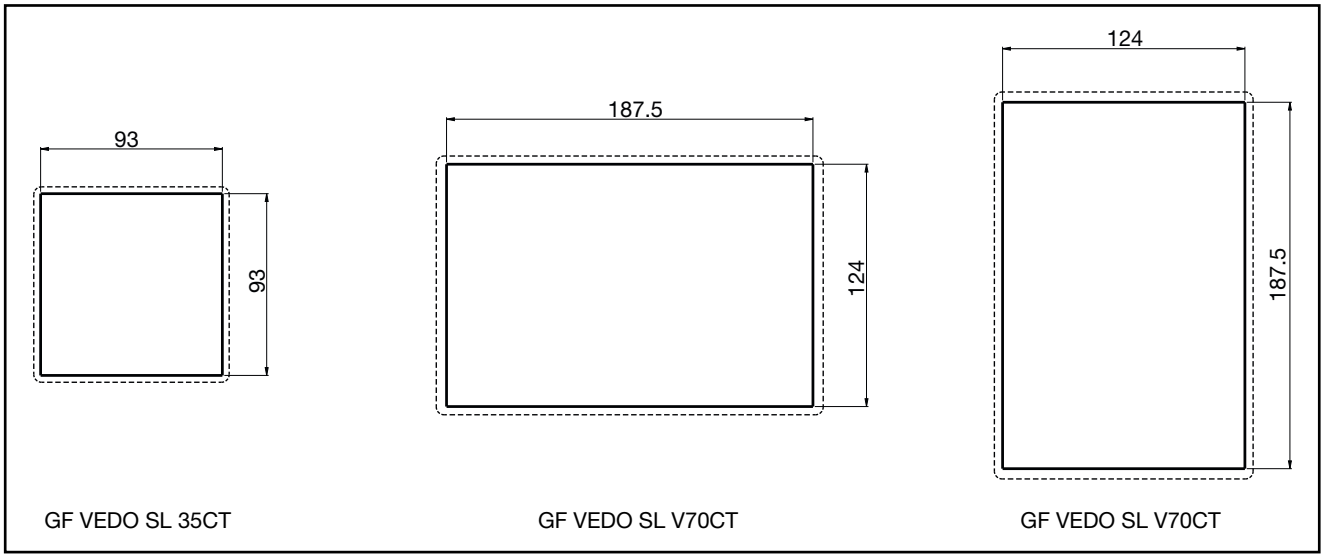


Figure 7 - Panel hole dimensions for GF_VEDO SL

Protection against infiltrations of water

The Integrated Controller and Operator Panel offers, first of all, a degree of protection of IP65.
It is therefore possible to install the device in particularly dusty environments or areas subject to splashes of water without problems:

- the compartment in which the device is housed also has to be dust and waterproof;
- the panel on which the device is installed must be perfectly smooth and flat on the front;
- the hole in the panel must scrupulously respect the dimensions indicated;
- the device has to be fastened tightly to the panel, to allow the gasket fitted at the back to ensure water tightness.

Vibrations

The Integrated Controller and Operator Panel can support vibrations up to 150 Hz:

- from 5 to 9 Hz: sinusoidal 3.5 mm constant;
- from 9 to 150 Hz: sinusoidal with acceleration equal to 1 G.

Should the device be mounted on a support that exceeds these limits it is necessary to envisage a system for the suspension and mitigation of the vibrations.

Minimum spaces for ventilation

The temperature of the compartment that houses the Integrated Controller and Operator Panel must not exceed 50 °C.
Figure 3 – Free spaces for ventilation shows the minimum free distances recommended in the installation of the device in a closed compartment.

Positioning

The Integrated Controller and Operator Panel has to be positioned in order to guarantee the following conditions:

- the screen must not be directly lit by the sun or particularly bright light sources.
- If necessary, screen direct rays, using an antiglare shutter for example;
- there must be no sudden temperature changes;
- there must be a low explosion risk: it can be connected to elements that operate in environments with a hazardous atmosphere (flammable or explosive) only through appropriate and suitable types of interface, compliant to the safety standards in force;
- low presence of magnetic fields.

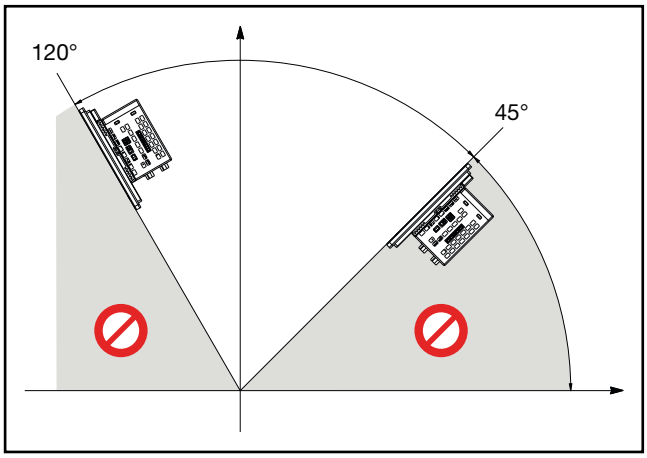


Figure 8 - GF_VEDO SL admitted angulation

The angulation of the controller must be between 45° and 120°, as shown in figure 8.

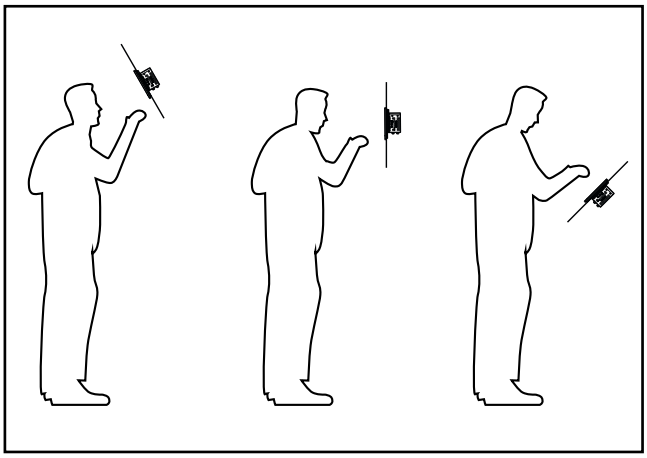


Figure 9 - Position and angulation

The angulation to choose also depends on the position of the controller compared to the operator, as shown in figure 9.

Fastening to the panel

Fit the die-cut rubber seal in the back of the Integrated Controller and Operator (figure 10).
The seal, supplied as standard, is essential to guarantee IP65-rated protection.

With GF VEDO SL 70CT and GF VEDO SL V70CT, fit the two metallic brackets supplied into the special housings on the short sides and fasten them in place with the screws (figure 11).

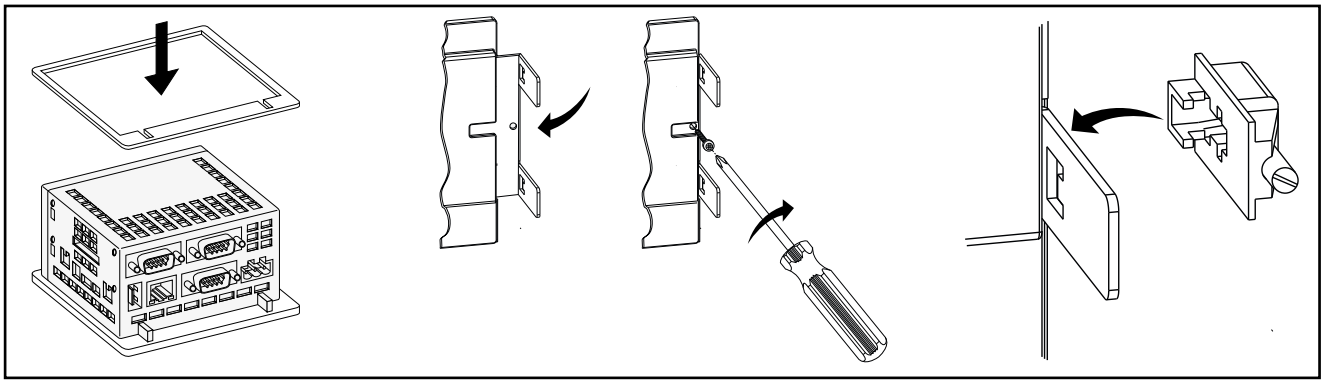


Figure 10 - Assembly of seal, metal bracket and terminal connection

Fit the Integrated Controller and Operator in the panel, connect the 4 terminals supplied to the device and tighten the screw until the device is fastened tightly to the panel.

There are 4 positions in which to connect the terminals, two per side.

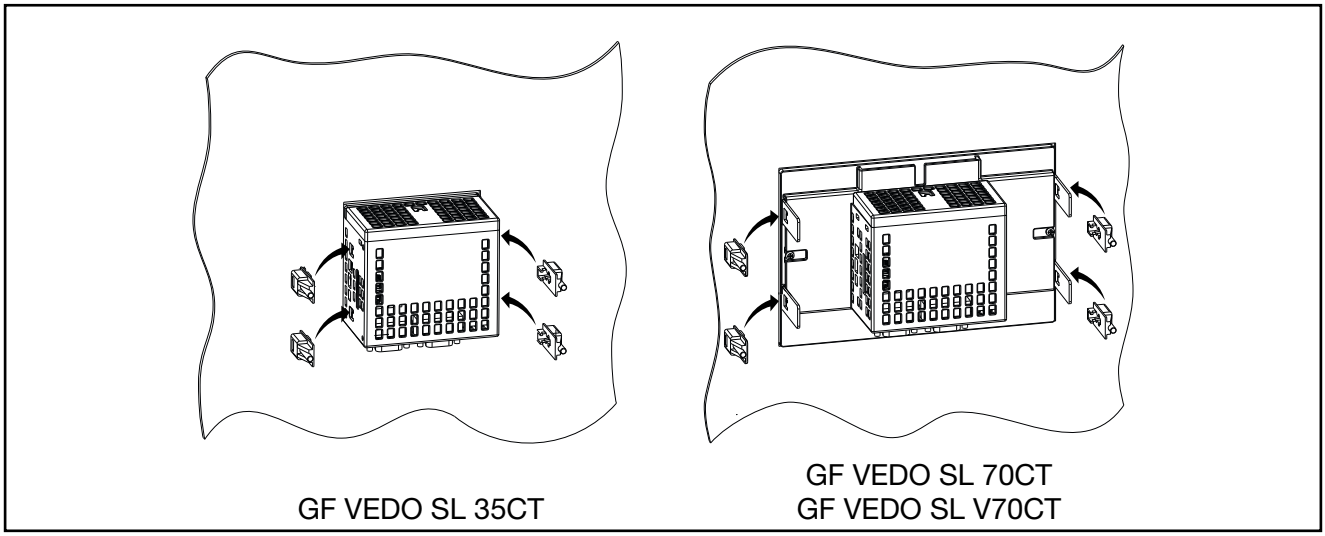


Figure 11 - Positions available for fastening terminals

Integrated Controller and Operator Panel Connections

Inputs, ports and signals

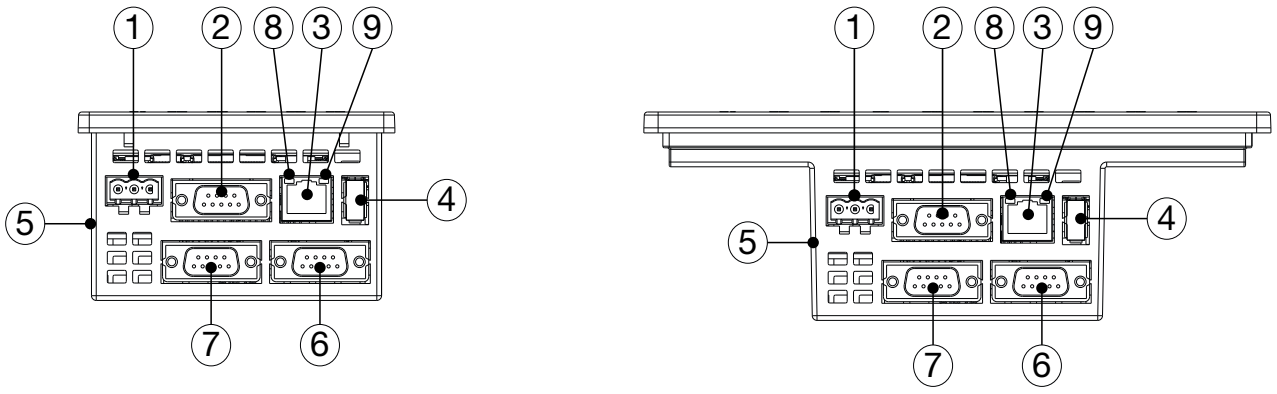


Figure 12 - GF_VEDO SL connector position

N.	Description	Connector / indicator	Note
1	Input power 24 Vdc ± 25%	Pull-out polarised terminal block	
2	CAN Port	DB9 M (D-sub 9 pin male)	
3	Ethernet Port 10/100 Mbit/s	RJ45	
4	USB Port	USB Type A	optional
5	SD Card Slot		optional
6	RS232 Port	DB9 M (D-sub 9 pin male)	optional
7	Insulated RS485 Port	DB9 M (D-sub 9 pin male)	optional
8	Green “Link” LED	Permanently on signals that the Ethernet connection is active	
9	Yellow “Data” LED	Flashing signals that data is being transferred	A high-speed transfer could make the yellow LED appear permanently on

Power

The Integrated Controller and Operator Panel must be connected to a 24 Vdc power supply unit.
The same 24 Vdc power supply can feed several devices (controller and CAN-IO modules).
Make sure that the current issued by the power supply is higher than the total maximum current absorbed by all the devices connected.

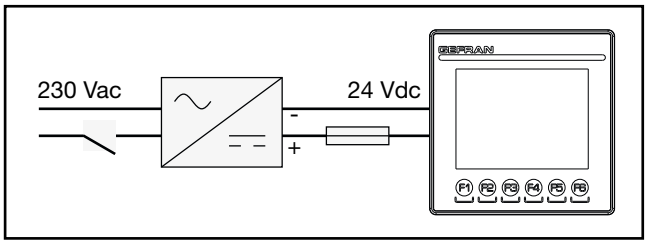


Figure 13 - GF_VEDO SL power

Considering that the device has no switch, it is necessary to install one before it, with a protective fuse.
The switch has to be positioned in the immediate vicinity of the device and be easy for the operator to reach.

For the 24 Vdc power supply, use a separate line from that used for electromechanical power devices such as relays, contactors, solenoids, etc.
If there are considerable changes in the mains voltage, use a voltage stabiliser.
Near to high frequency generators or arc welders, use adequate grid filters.

Connect the power cables to the power connector.
Fit the cylindrical nucleus in ferrite, supplied with the product, as close as possible to the device to limit the susceptibility of the device to electromagnetic disturbance
(figure 14).

The 24 Vdc power cables must follow a separate route from the power cables of the system or the machine.

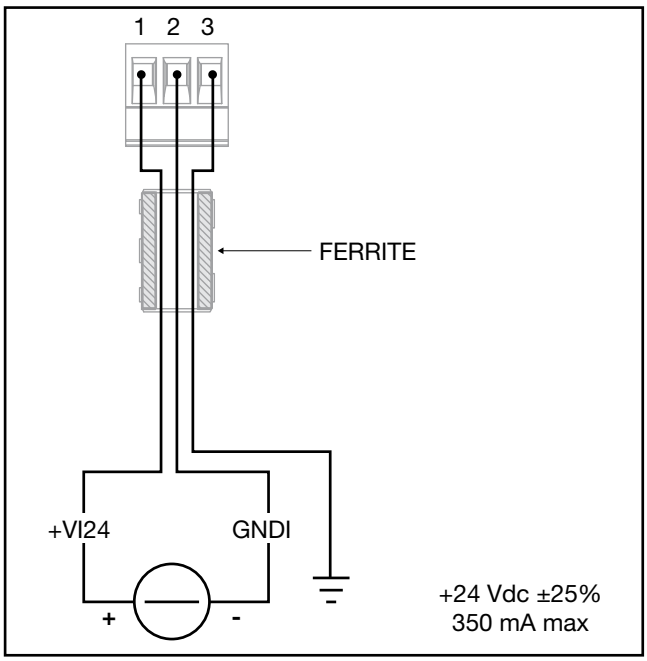


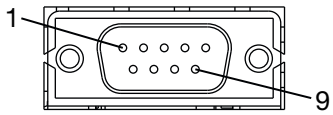
Figure 14 - GF_VEDO SL power connection

Attention: make sure that the earth connection is efficient. A non-existent or inefficient earth connection can make the operation of the device unstable, due to excessive environmental disturbance.
In particular, check that:

- the voltage between ground and earth is < 1 V;
- the ohm resistance is < 6 Ω.

CAN

Connect the cable for the CAN field bus (CANopen protocol). The CAN bus connects the various CAN devices, such as the CAN-IO modules, to the Integrated Controller and Operator Panel.
Considering that the CAN port is opto-isolated, it is not necessary to disconnect the power to the device before connecting it.
For the wiring of the line, use an approved cable.
Fasten the cable connector to that of the controller with the appropriate screws.



Pin	Name	Description
1		
2	CAN_L	CAN-Low (CAN-)
3	GND	Ground (mass)
4		
5	EARTH	Earth
6		
7	CAN_H	CAN-High (CAN+)
8		
9		

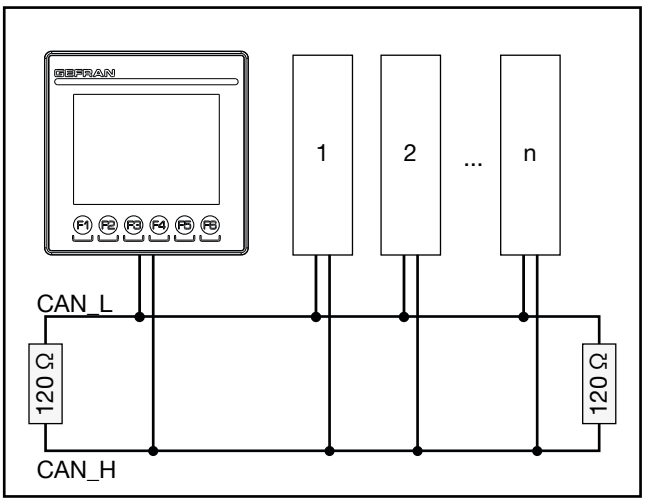


Figure 15 - CAN bus line termination

The line termination is not fitted in the controller. It is therefore necessary to fit two terminations (resistor 120 Ω, . W, 5%) at the ends of the CAN bus, as shown in figure 15.
Note: If the last device of the CAN bus is a CAN-IO module, it is possible to activate the termination in the module with the appropriate switches (see the CAN-IO documentation).

Ethernet

If necessary, connect the Ethernet cable to the Ethernet RJ45 port. The Ethernet port allows connection of the Integrated Controller and Panel to a computer or to a company LAN network. The connection cable to use (either straight or crossover) depends on the type of device that has to be connected. For example, to directly connect a PC it is necessary to use a crossover cable.

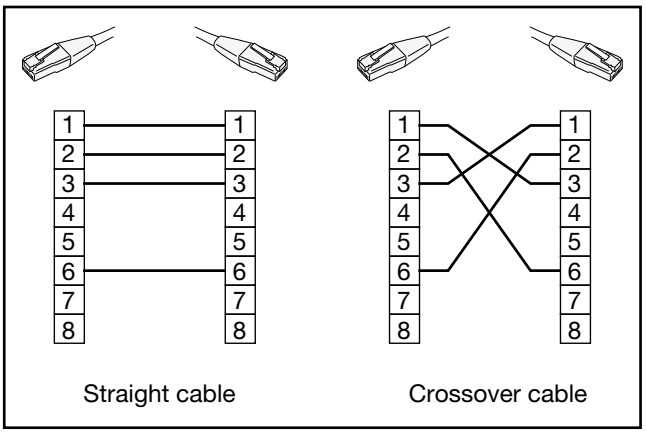


Figure 16 - straight and crossover Ethernet cables

For the connection, use a CAT6 UTP cable or superior.
The maximum length of the Ethernet cable is 100 metres.

Do not run the Ethernet cable alongside the machine power cables, to avoid interference with data transmission.

The RJ45 socket has two LEDs. When the Ethernet connection is active, the green LED stays permanently lit; when data is being transmitted, the yellow LED flashes.

USB

The USB port is optional and is used to connect external devices compliant to the USB standard.
The connector is Type A and the port supports version USB 2.0, with speed up to 480 Mbit/s.
The port is able to issue a current of 500 mA at 5 Vdc to power USB devices.
The maximum length allowed for the USB cable is 5 metres.

Transfer cable

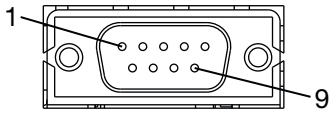
It is possible to directly access the USB port of the controller from the panel using the transfer cable (accessory to order separately).
To fit the socket of this cable, the panel thickness, in the position chosen, should not exceed 2 mm.

SD Card

The SD Card slot is optional and allows use of the SD Card mass memories to store data and applications.
The SD Card can be used and removed at will.
Before removing it, make sure that there are no writing operations in progress.

RS232

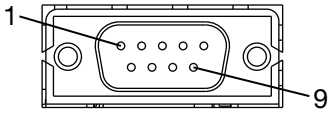
The RS232 port is optional. Considering that the RS232 port is not insulated, it is necessary to disconnect the power to the Integrated Controller and Operator Panel and to the device to be connected before connecting them.
The connection cable must be screened and not exceed a length of 5 metres.
Tighten the cable connector to that of the controller using the special screws.



Pin	Name	Description	Signal Flow
1	DCD	Data Carrier Detect	Input
2	RxD	Received Data	Input
3	TxD	Transmitted Data	Output
4	DTR	Data Terminal Ready	Output
5	GND	Ground	Mass
6	DSR	Data Set Ready	Input
7	RTS	Request To Send	Output
8	CTS	Clear To Send	Input
9	RI	Ring Indicator	Input

RS485

The RS485 port is optional.
Considering that the RS485 is opto-isolated, it is not necessary to disconnect the power to the Integrated Controller and Operator Panel and to the device to be connected before connecting them.
Tighten the cable connector to that of the controller using the special screws.



Pin	Name	Description
1		
2	TX/RX+	Data +
3		
4	TX/RX-	Data -
5	GND	Ground
6		
7		
8		
9		

The RS485 connection can be used successfully over long distances and in environments characterised by considerable disturbance.
The maximum length of the cable depends on the transmission speed, as shown in figure 17.

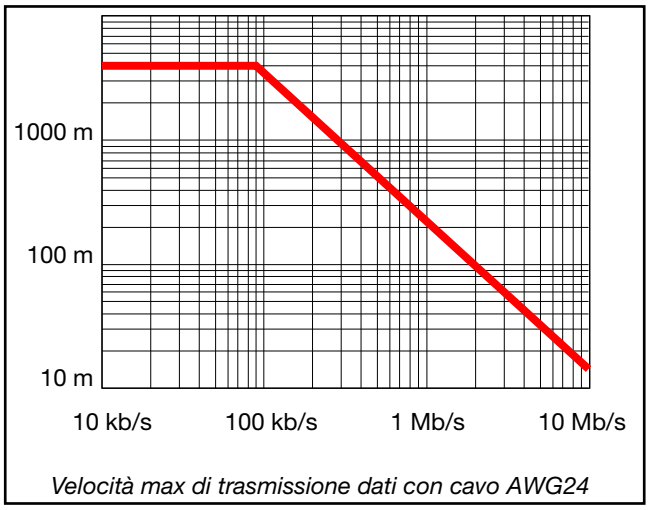


Figure 17 - RS485 max transmission speed

CAN-IO module assembly

Attention: CAN-IO modules can be supplied in the version for assembly onto plate and in the version for assembly onto 35 mm DIN runner.
For assembly, follow the instructions relating to the version of the module owned.

Assembly on plate

The fastening holes of the CAN-IO module have a diameter of 4.5 mm. Figure 17 shows the positions of the holes on the various models of module. Figures 5 and 6 show the distances between the centres of the fastening holes. The spacer for connection with the plate must have a minimum length of 12 mm.
For correct assembly, it is necessary to use all the fastening holes envisaged on the card.

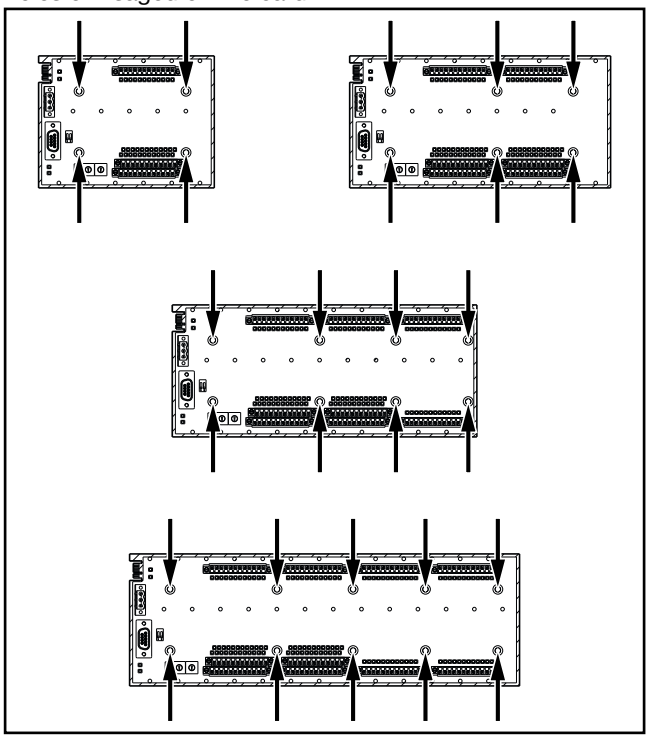


Figure 18 - Fastening hole position

Assembly on DIN runner

The card can be fitted with two hooks for fitting to 35 mm DIN runners. To fasten the card in place, insert the upper part of the hook over the runner, turn the card and press it until it clicks into place, hooking also under the runner.

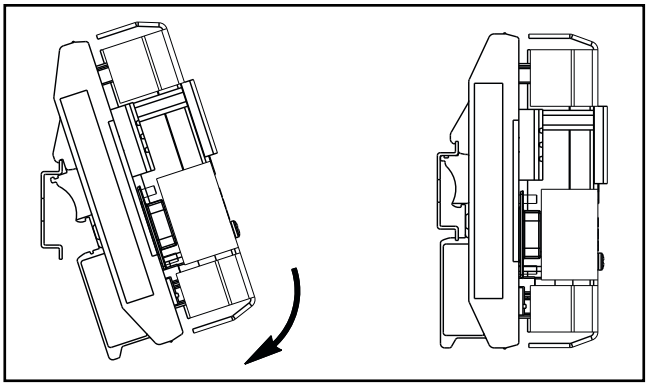


Figure 19 - Assembly on DIN runner

To remove a card fastened to a DIN runner, release the 2 lower hook, levering slightly with a screwdriver and turning the card to release it.

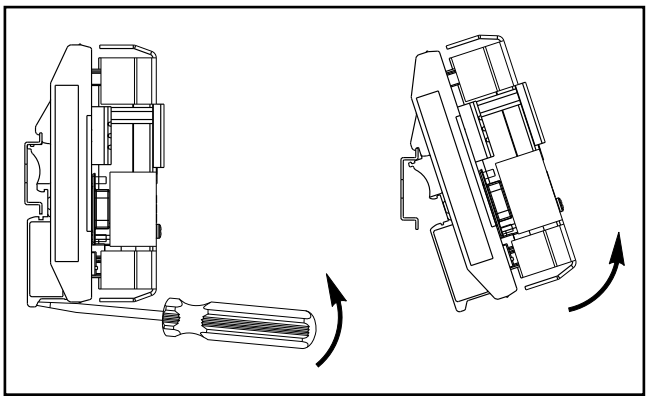


Figure 20 - Dismantling from DIN runner

Positioning

The CAN-IO module is installed vertically on the long side or the short side. In this second case, the power connections and CAN have to face downwards.

The module cannot be installed horizontally.

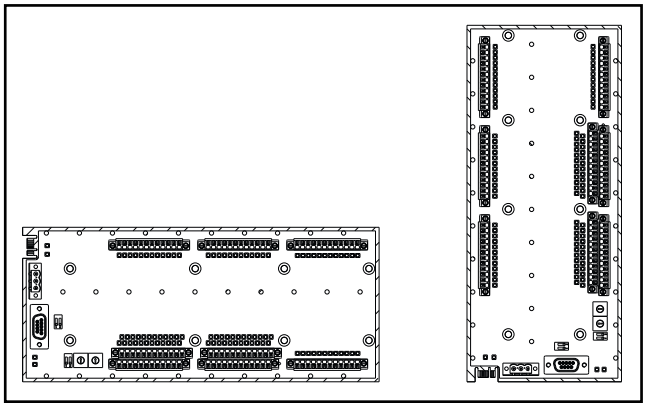


Figure 21 - CAN-IO assembly direction

CAN-IO module connections

Connectors, signals and configuration elements

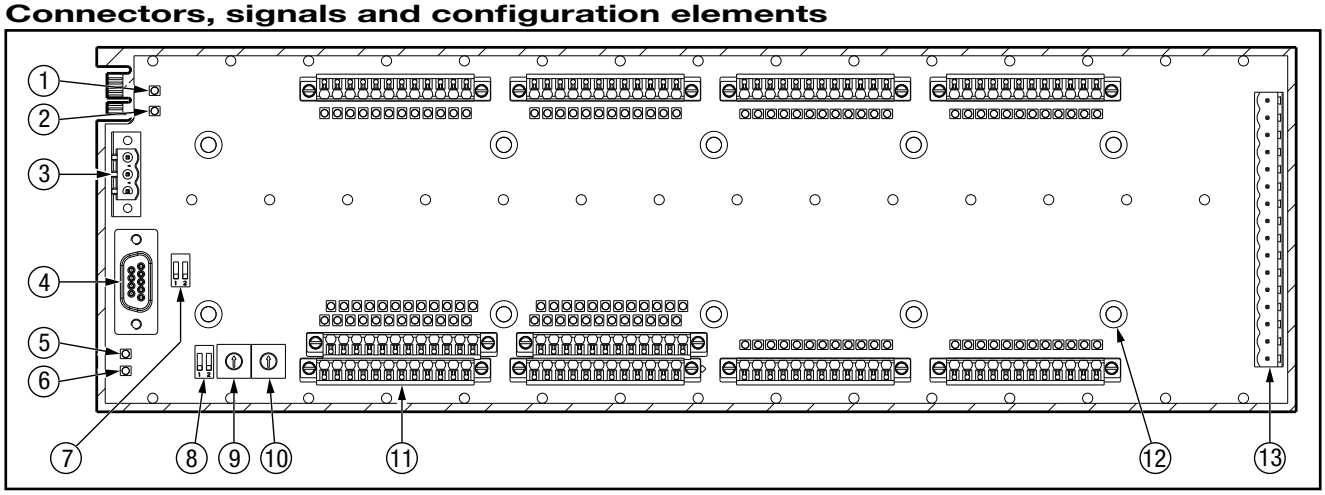


Figure 22 - CAN-IO module element position

N.	Description	Connector / indicator	Note
1	Power	Yellow LED	
2	Run	Green LED	programme running
3	Power input 24 Vdc ± 25%	Terminal block	
4	Porta CAN	DB9 M (D-sub 9 pin male)	
5	CAN Run	Green LED	
6	CAN Fail	Red LED	
7	CAN termination	Switch	
8	CAN address hundreds selection	Switch	
9	CAN address tens selection	Dial	
10	CAN address units selection	Dial	
11	I/O connections		
12	Plate fastening hole		
13	Relay connections		only in CAN-IO modules with relay

Figure 22 shows a general card with type 1 I/O connectors. Depending on the customer's requirements, the card may also have been supplied with other types of connector. The use of the single connector is identified by its silkscreened details.

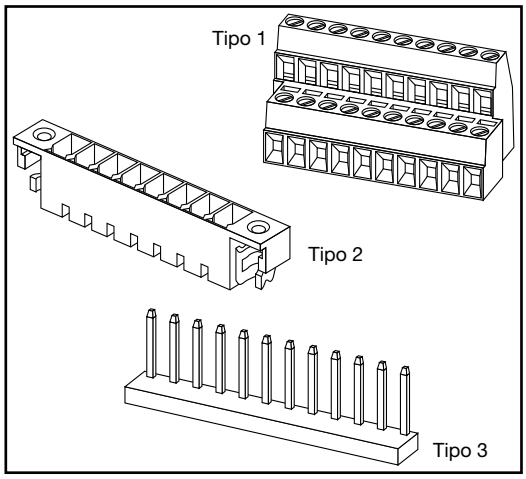


Figure 23 - Types of I/O connector

Power

The CAN-IO module must be connected to a 24 Vdc power supply unit. The same 24 Vdc power supply can feed several devices (controller and CAN-IO modules).
Make sure that the current issued by the power supply is higher than the total maximum current absorbed by all the devices connected

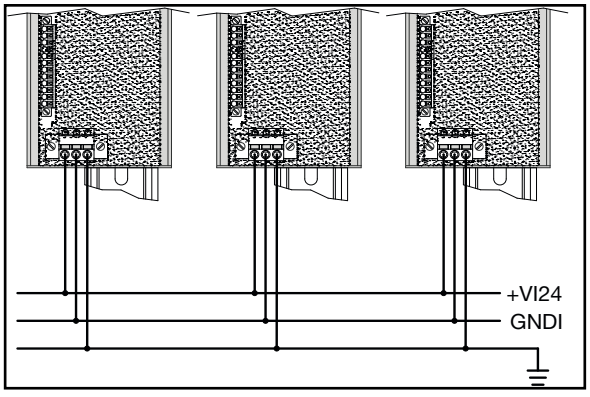


Figure 24 - CAN-IO module multiple power supply

Considering that the device has no switch, it is necessary to install one before it, with a protective fuse.
The switch has to be positioned in the immediate vicinity of the device and be easy for the operator to reach.

For the 24 Vdc power supply unit, use a separate line from that used for electromechanical power devices such as relays, contactors, solenoids, etc.
If there are considerable changes in the mains voltage, use a voltage stabiliser.
Near to high frequency generators or arc welders, use adequate grid filters.

Connect the power cables to the power connector. Fit the cylindrical nucleus in ferrite, supplied with the product, as close as possible to the device to limit the susceptibility of the device to electromagnetic disturbance (figure 25).

The 24 Vdc power supply cables must follow a separate path from the power cables of the plant or machine.

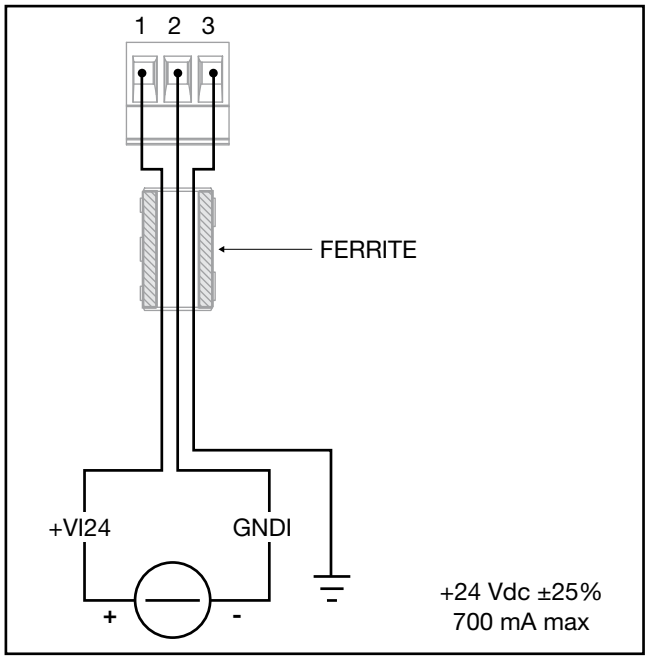
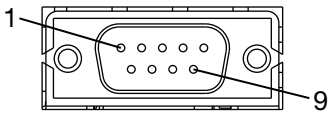


Figure 25 - CAN-IO power connection

Attention: Amake sure that the earth connection is efficient. A non-existent or inefficient earth connection can make the operation of the device unstable, due to excessive environmental disturbance. In particular, check that:
- the voltage between ground and earth is <1V;
- the ohm resistance is < 6 Ω.

CAN

Connect the cable for the CAN field bus.
The CAN bus connects the CAN-IO modules to the Integrated Controller and Operator Panel.
Considering that the CAN port is opto-isolated, it is not necessary to disconnect the power to the device before connecting it.
For the wiring of the line, use an approved cable.
Fasten the cable connector to that of the controller with the appropriate screws.



Pin	Name	Description
1		
2	CAN_L	CAN-Low (CAN-)
3	GND	Ground (mass)
4		
5	EARTH	Earth
6		
7	CAN_H	CAN-High (CAN+)
8		
9		

The CAN-IO module is equipped with a line termination.

Attention: if the module is the latest device on the CAN line, activate the termination, switching both switches to ON (see figure 24).
The CAN-IO module leaves the factory with the termination deactivated (OFF).

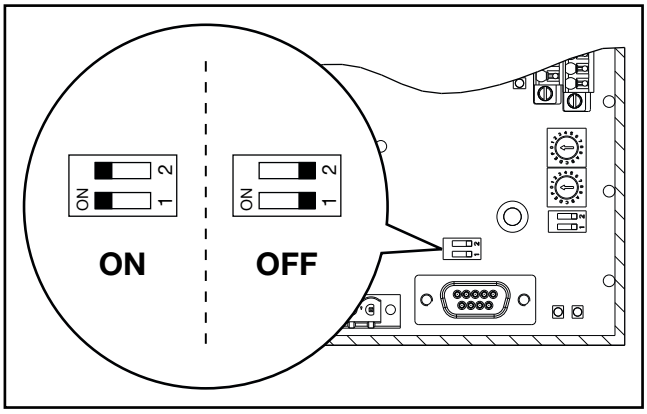


Figure 26 - Switch per terminazione linea CAN

The CAN line must be terminated at both ends.
If the device at the end of the CAN line is not equipped with its own termination, it is possible to terminate the line installing a resistor (120 Ω, 1/4W, tolerance 5%), as shown in figure 27.

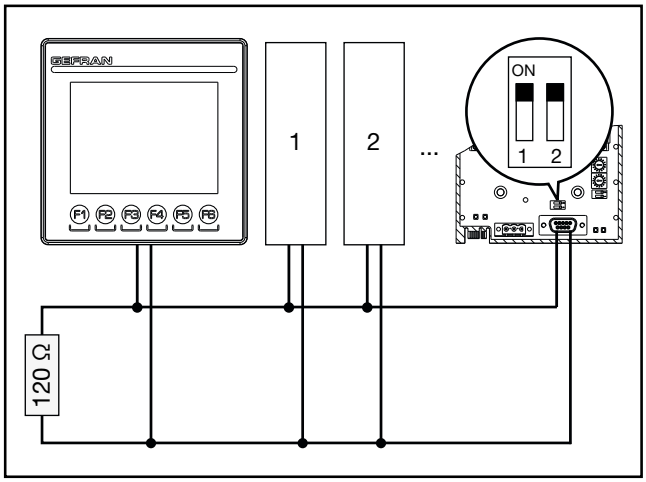


Figure 27 - CAN bus line terminations

Heading the wires

The wires are not insulated. When using type 1 or 2 connectors it is optionally possible to head the wires with cable sockets

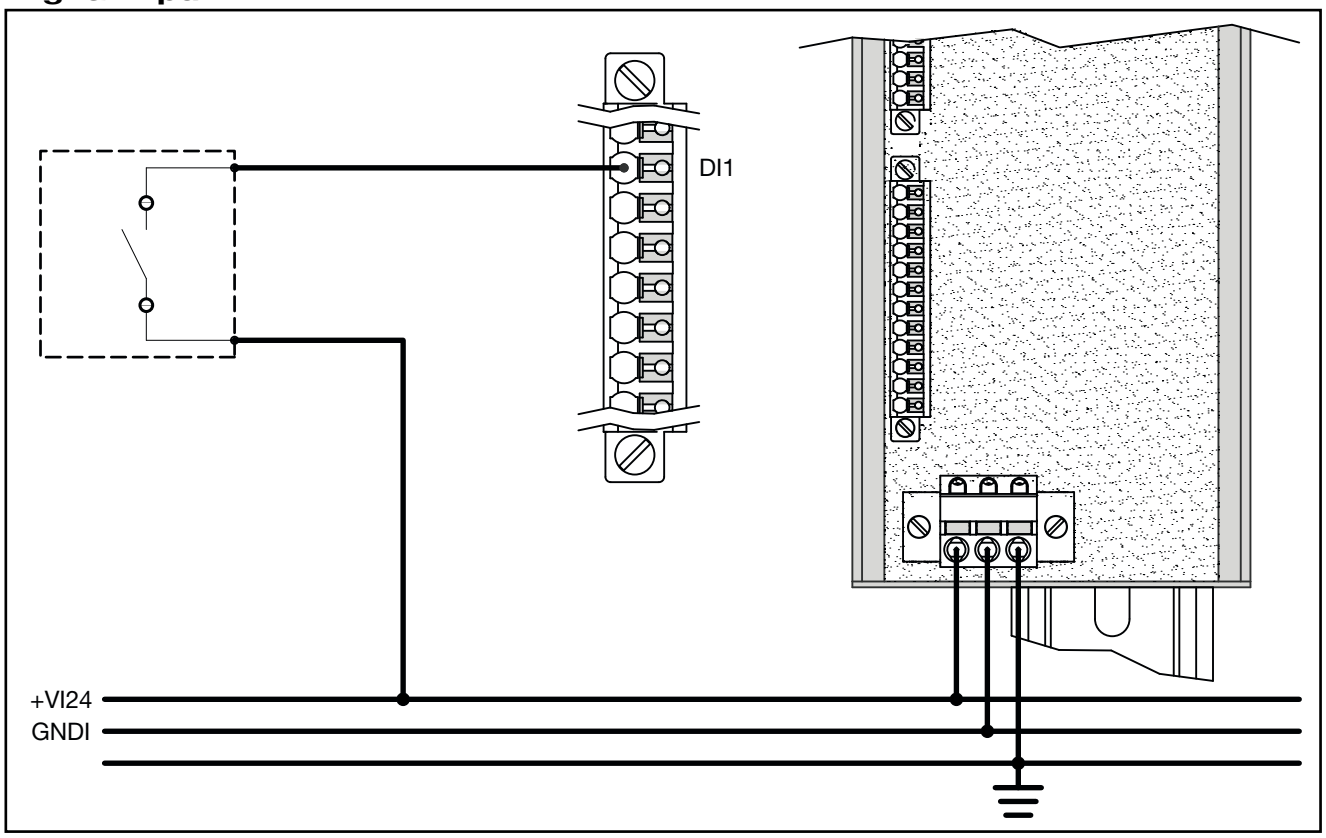
Identification of inputs and outputs

The inputs and outputs of the module are identified on the card with the following codes:

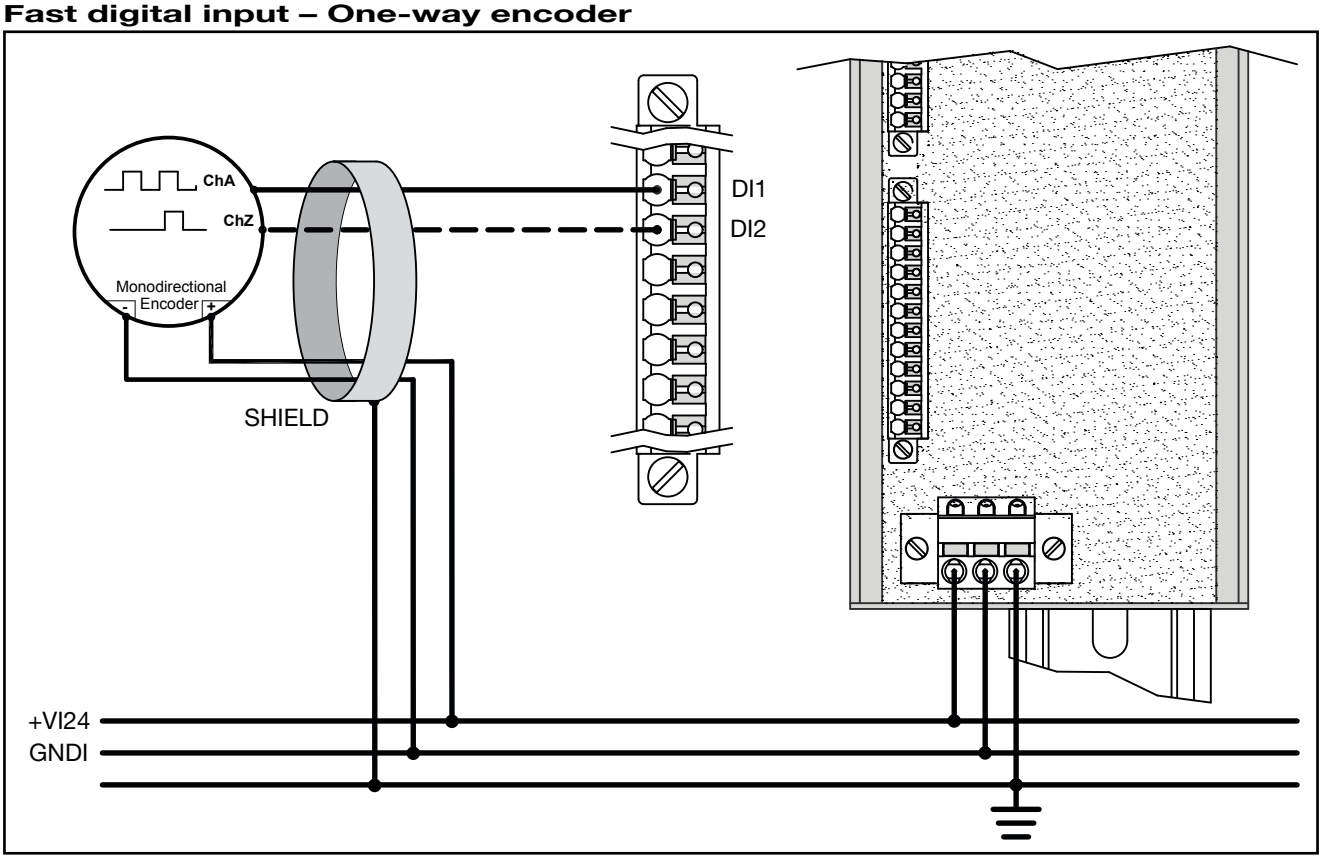
Code	Interval	Description
+VI24		Card power +24 Vdc
GNDI		Ground (0 V)
PSx+	from PS1+ to PS3+	Digital power, positive pole
PSx-	from PS1+ to PS3-	Digital power, reference pole
DGND		Reference ground for digital pins
AGND		Reference ground for analogue pins
		Functional earth
DIx	from DI1 to DI24	Digital input
HSC_x	from HSC_1 to HSC_6	Fast digital input
POTx+	from POT1+ to POT8+	Potentiometer input, positive pole power
POTx-	from POT1- to POT8-	Potentiometer input, reference pole power
POTxS	from POT1S to POT8S	Potentiometer input, signal
SGx+	from SG1+ to SG8+	Electric resistance extensometer input, positive pole power
SGx-	from SG1- to SG8-	Electric resistance extensometer input, negative pole power
SGxP	from SG1P to SG8P	Electric resistance extensometer input, positive pole
SGxN	from SG1N to SG8N	Electric resistance extensometer input, negative pole
TCx+	from TC1+ toTC10+	Thermocouple input, positive pole
TCx-	from TC1- toTC10-	Thermocouple input, negative pole
RTx+	from RT1+ to RT10+	Thermo resistance input PT100, positive pole
RTx-	from RT1- to RT10-	Thermo resistance input PT100, negative pole
RTxC	from RT1C to RT10C	Thermo resistance input PT100, third wire
RTKx+	from RTK1+ to RTK10+	Thermo resistance input PT1000, positive pole
RTKx-	from RTK1- to RTK10-	Thermo resistance input PT1000, negative pole
RTKxC	from RTK1C to RTK10C	Thermo resistance input PT1000, third wire
DOLx	from DOL1 to DOL16	Digital output 0,5 A / PWM output
DOHx	from DOH1 to DOH16	Digital output 2 A
HSO_x	from HSO_1 to HSO_8	Fast digital output
AOVx	from AOV1 to AOV8	Analogue output in voltage
AOCx	from AOC1 to AOC8	Analogue output in current
ROx	from RO1 to RO8	Relay output
Com ROx		Relay output, common pole

Connection diagrams

Digital input

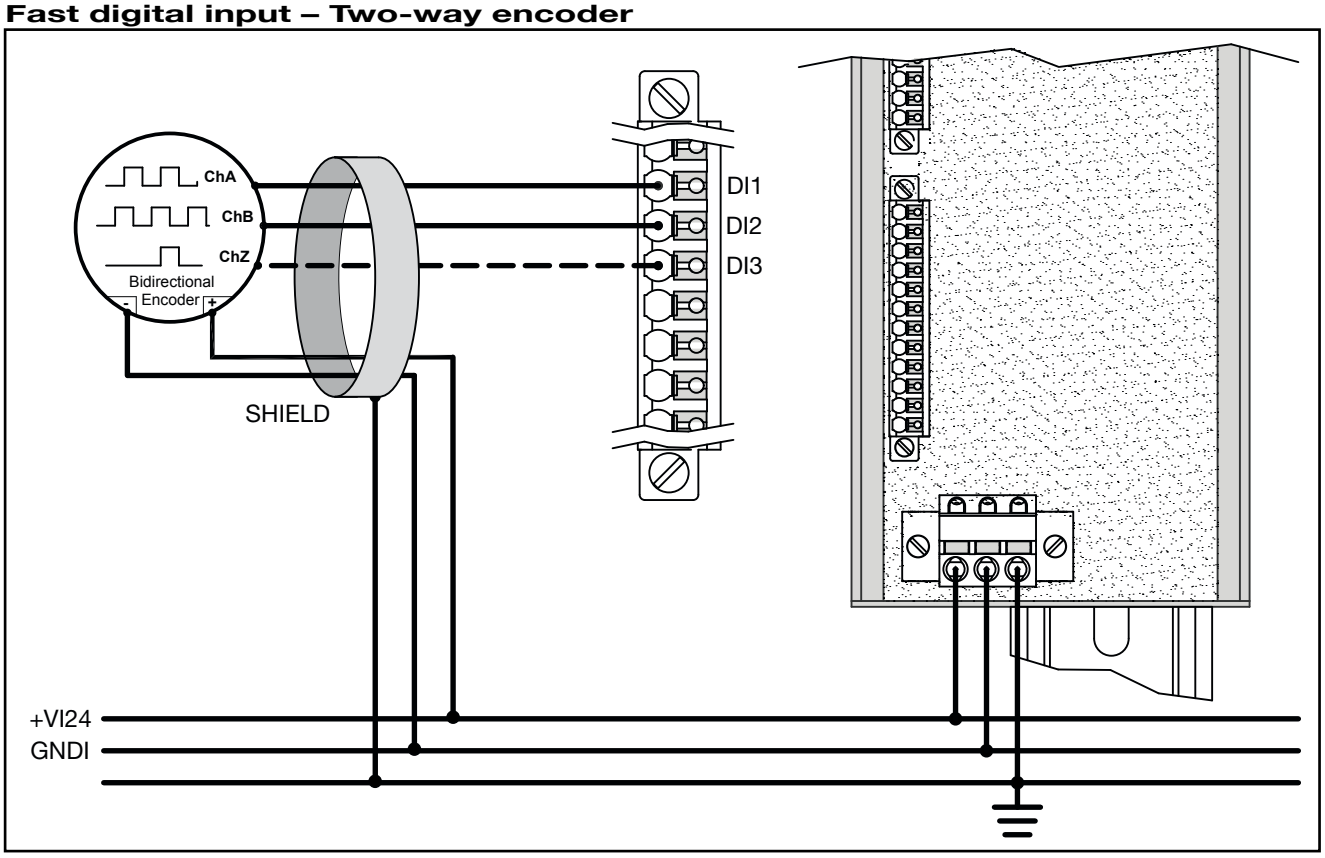


Fast digital input – One-way encoder



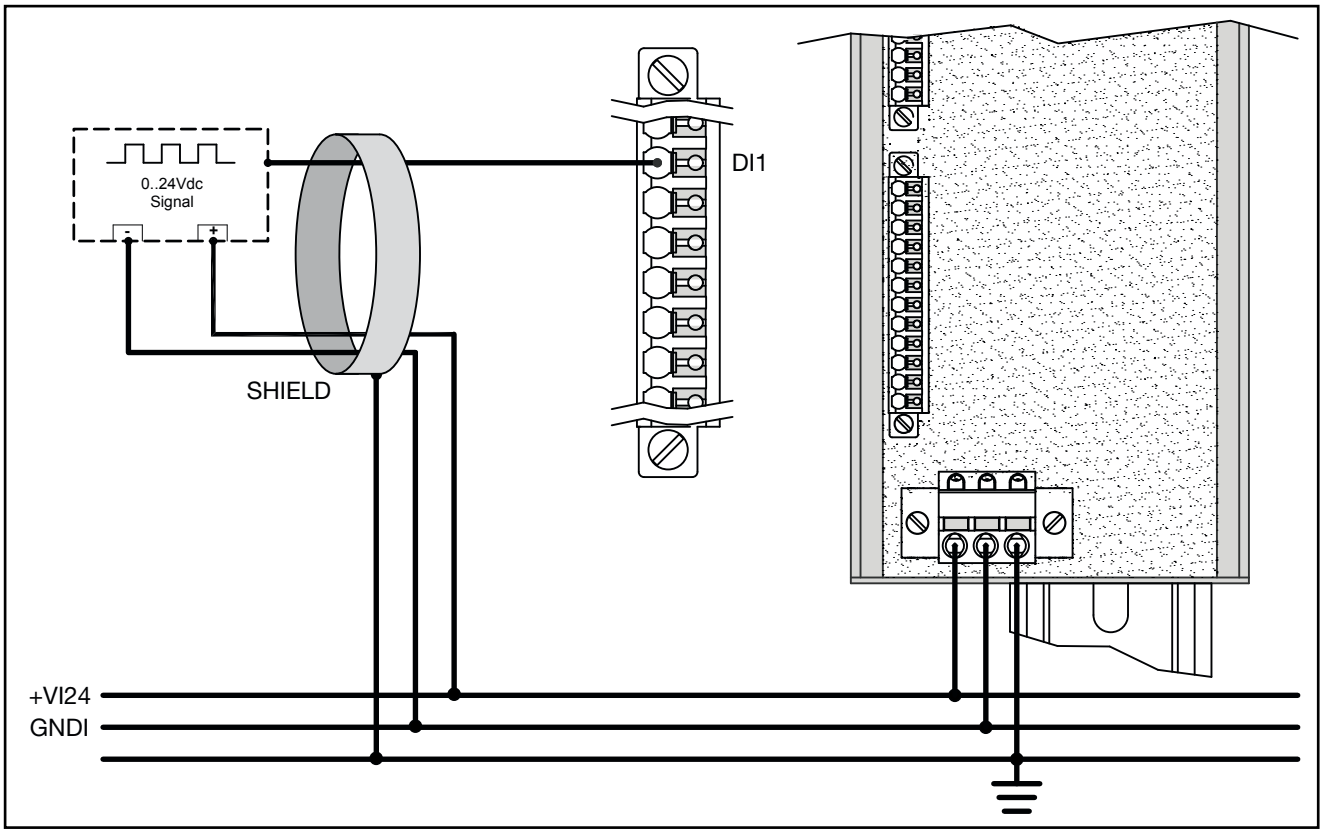
Use a screened cable with 4 conductors and connect the screening to the earth bar as close as possible to the module.
The input has to be configured via software.

Fast digital input – Two-way encoder



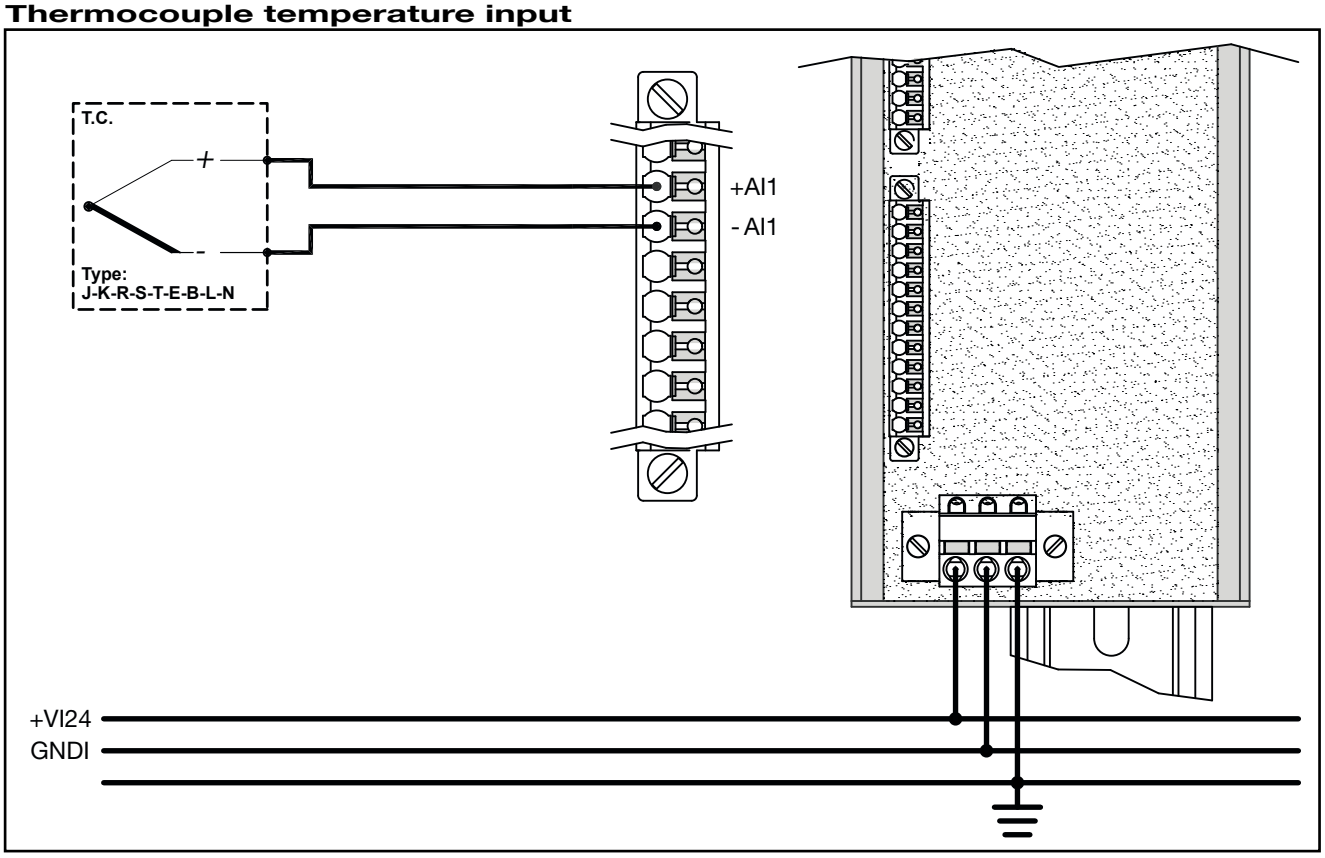
Use a screened cable with 5 conductors and connect the screening to the earth bar as close as possible to the module.
The input has to be configured via software.

Fast digital input – Impulse counter / Period measurer / Frequency measurer / Duty-cycle measurer / Impulse duration measurer



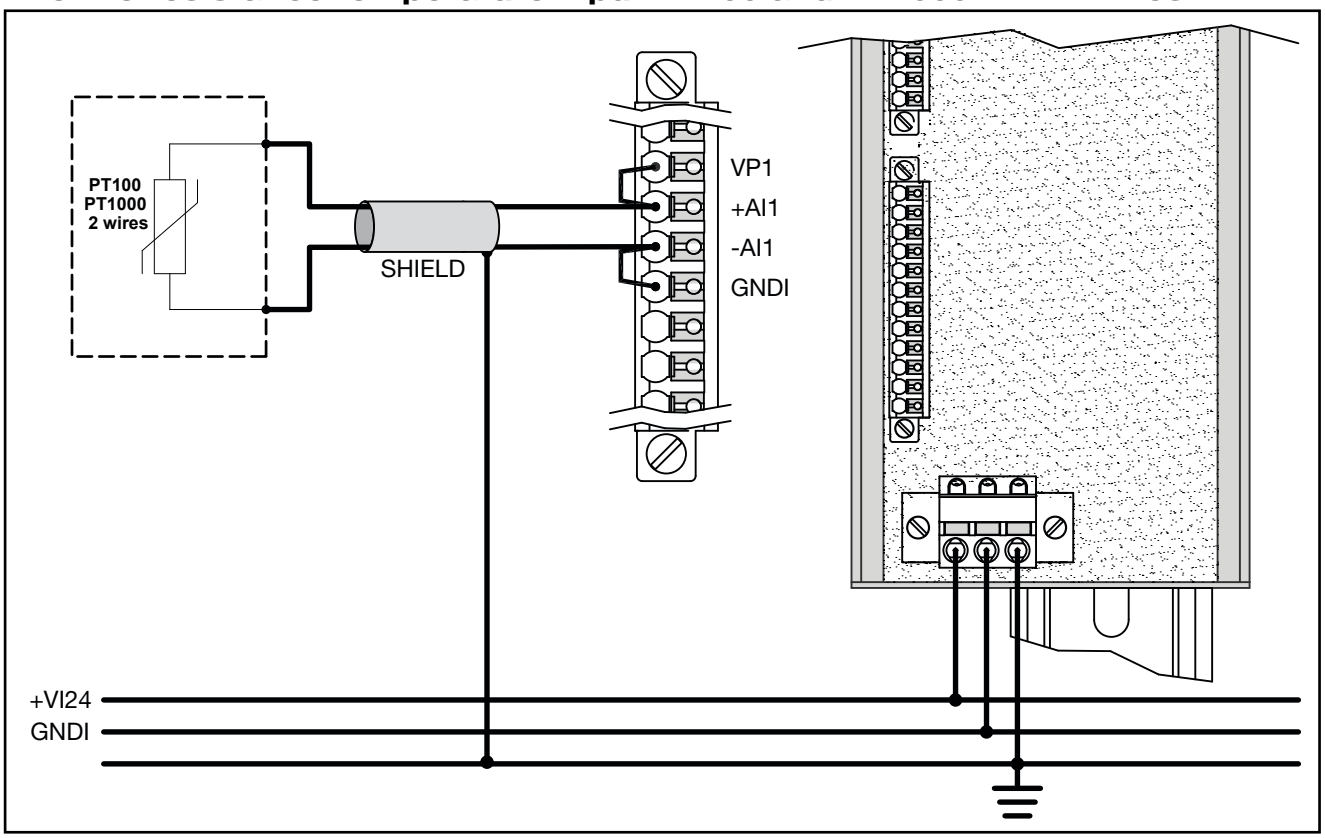
Use a screened cable with 3 conductors and connect the screening to the earth bar as close as possible to the module.
The input has to be configured via software.

Thermocouple temperature input



For the connection use a compensated cable. If using a screened cable, connect the screening to the earth bar as close as possible to the probe. The screening is connected to earth on the hot joint of the probe.

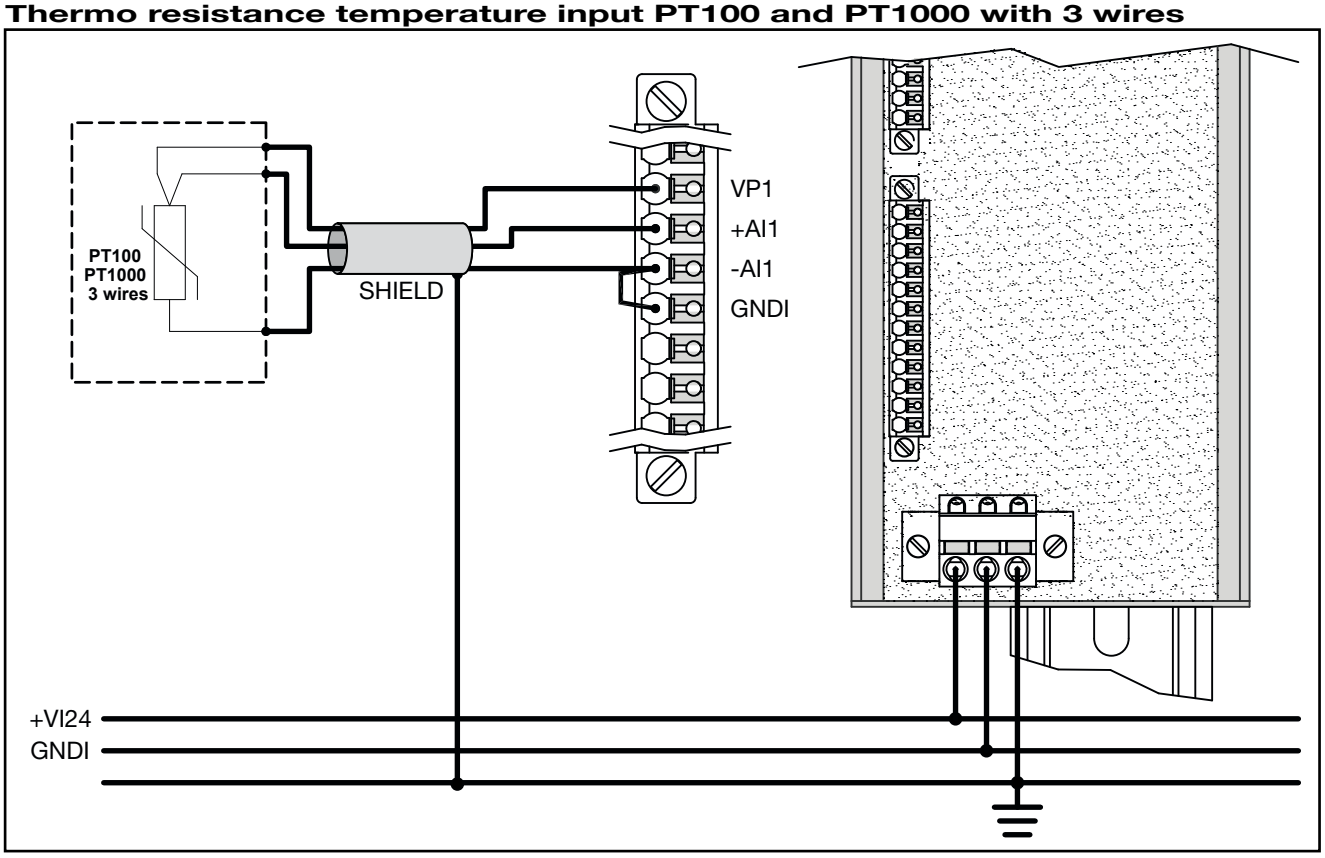
Thermo resistance temperature input PT100 and PT1000 with 2 wires



Use a screened bipolar cable and connect the screening to the earth bar as close as possible to the module.

Attention: do not forget to bridge the VP1 port with + AI1 and the GNDI port with -AI1.

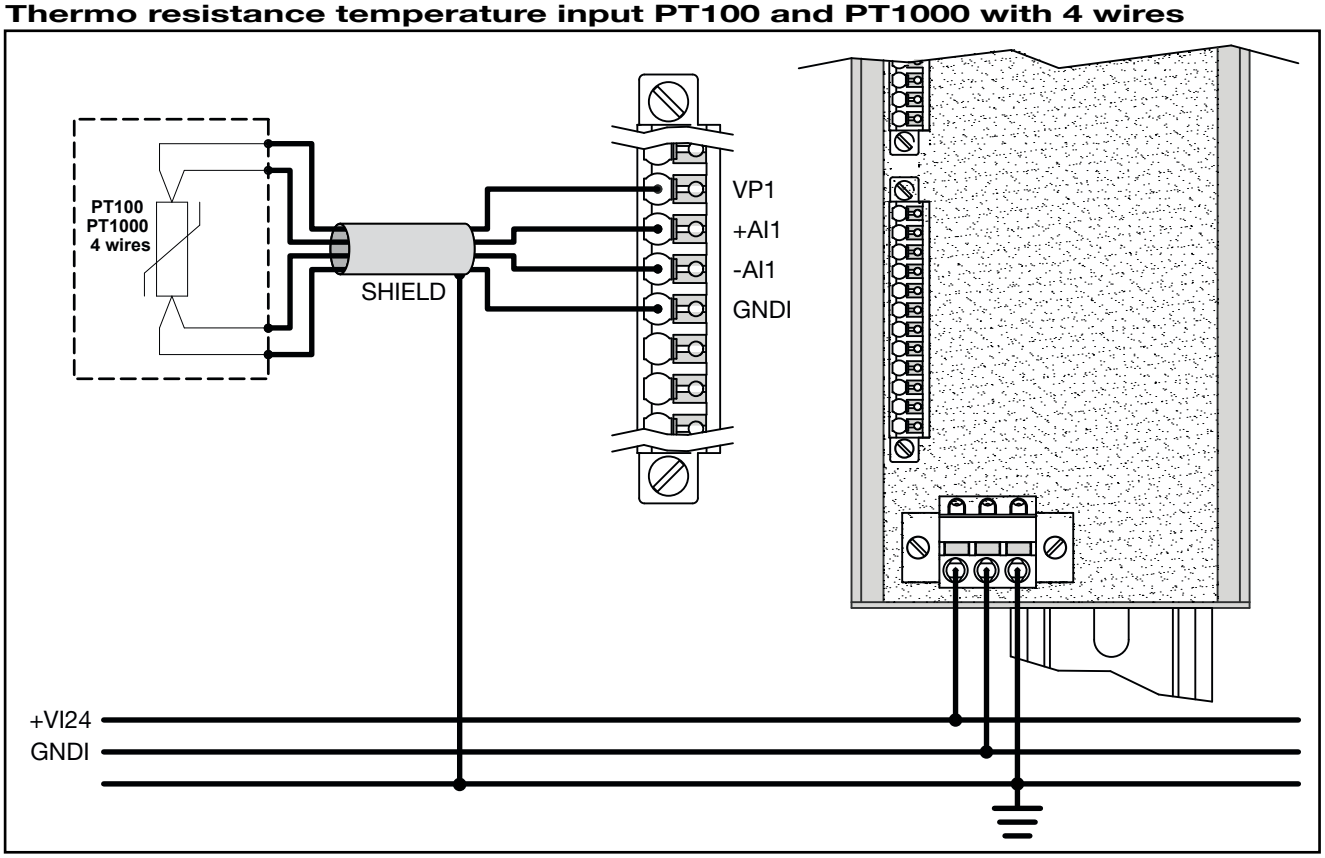
Thermo resistance temperature input PT100 and PT1000 with 3 wires



Use a screened cable with 3 conductors and connect the screening to the earth bar as close as possible to the module.

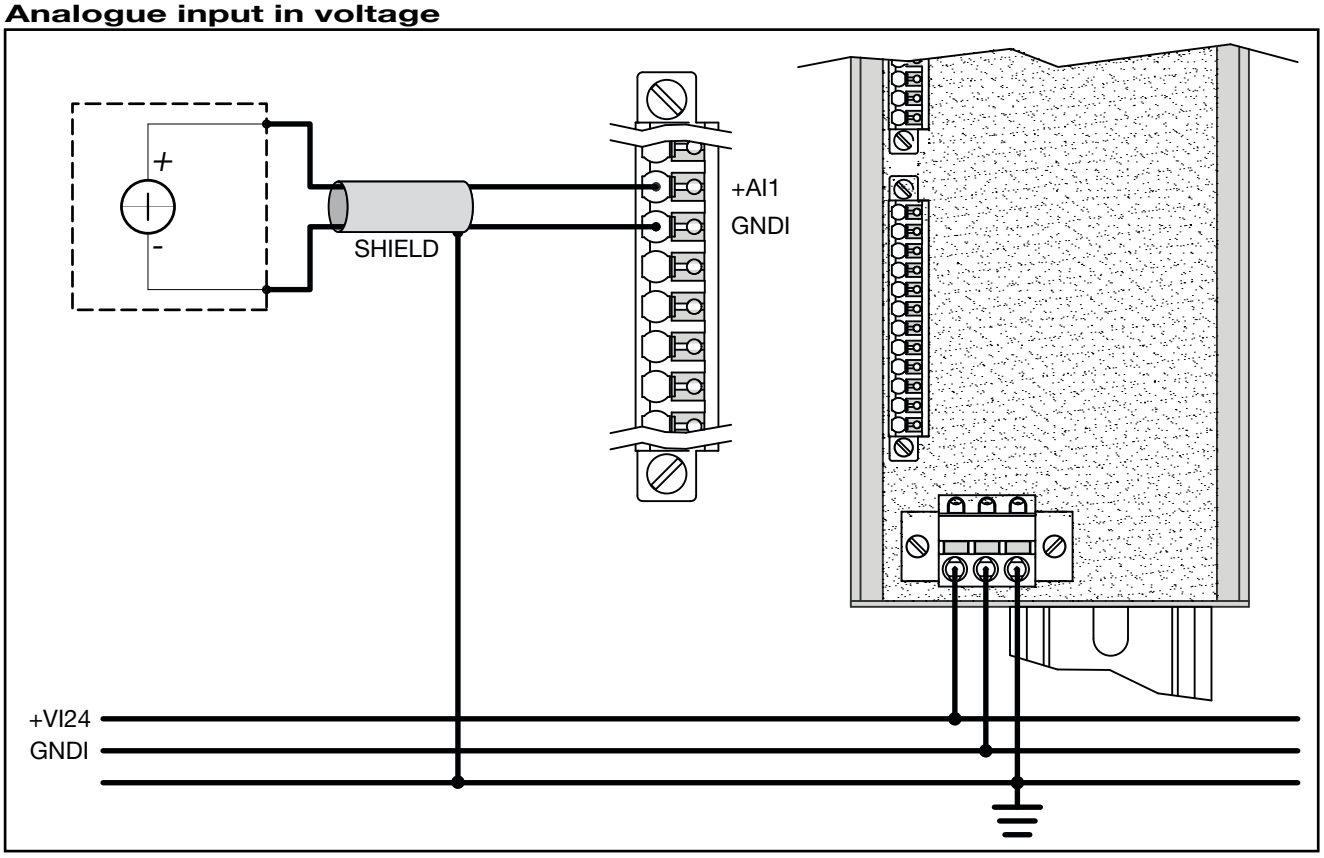
Attention: do not forget to bridge the GNDI port with -AI1.

Thermo resistance temperature input PT100 and PT1000 with 4 wires



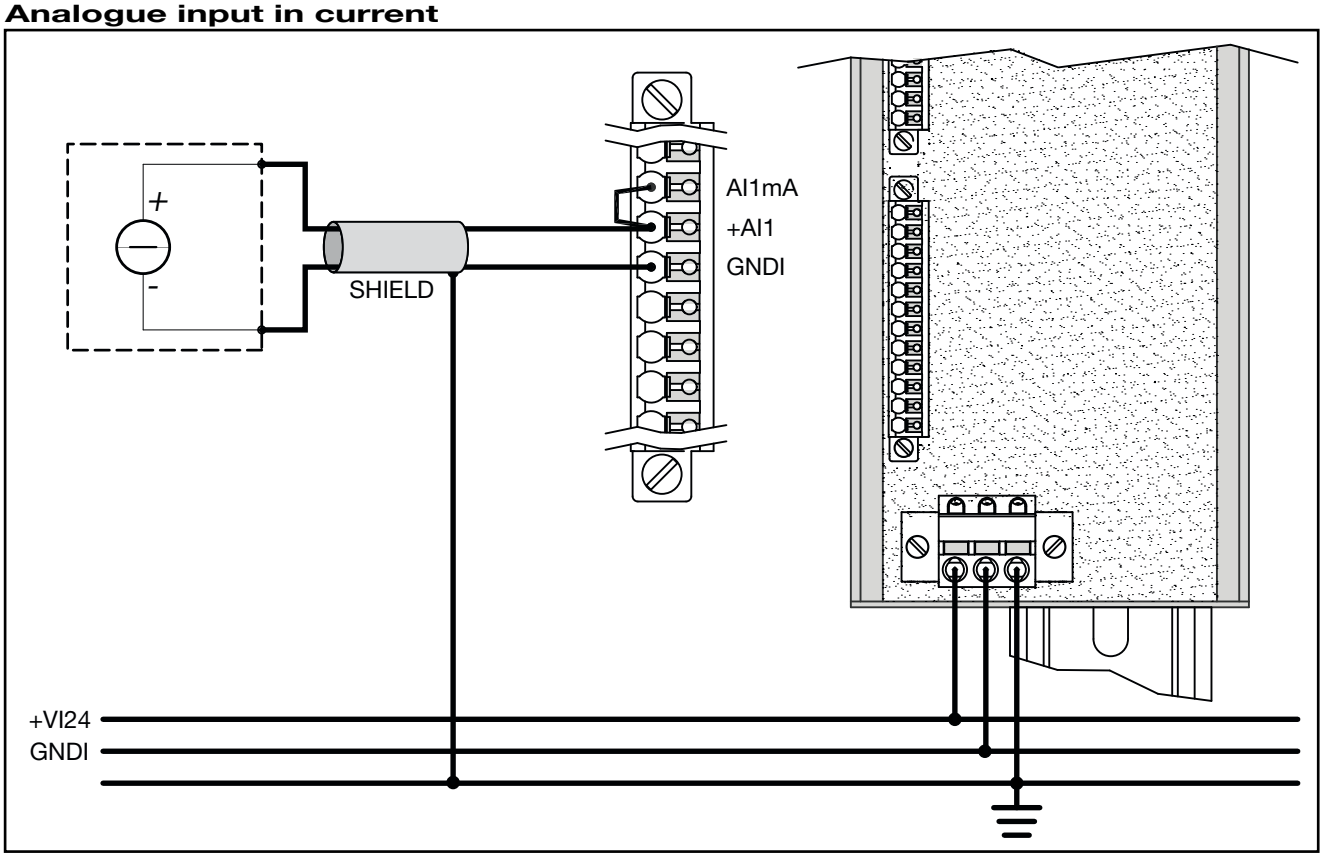
Use a screened cable with 4 conductors and connect the screening to the earth bar as close as possible to the module.

Analogue input in voltage



Use a screened bipolar cable and connect the screening to the earth bar as close as possible to the source of voltage.

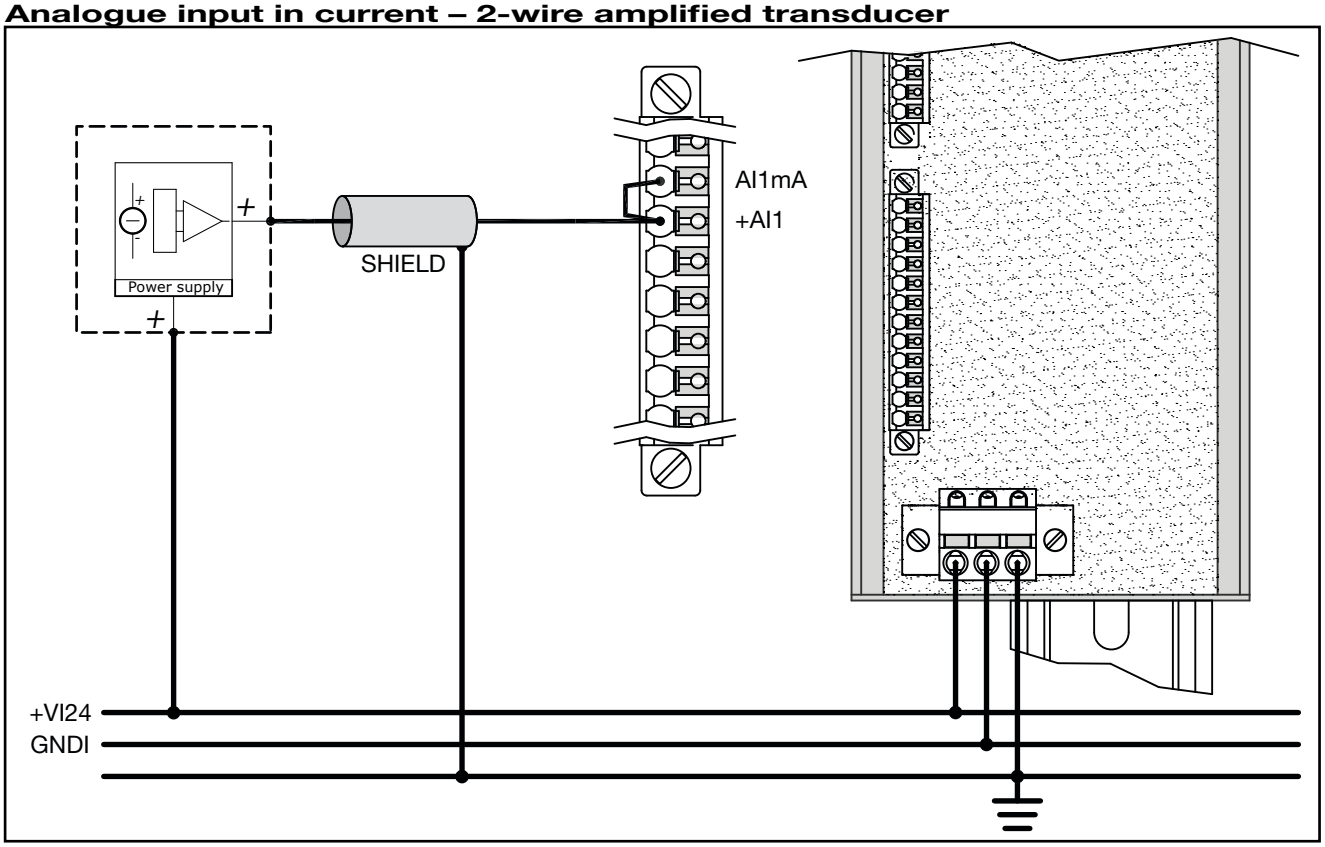
Analogue input in current



Use a screened bipolar cable and connect the screening to the earth bar as close as possible to the source of current.

Attention: do not forget to bridge the AI1mA port with +AI1.

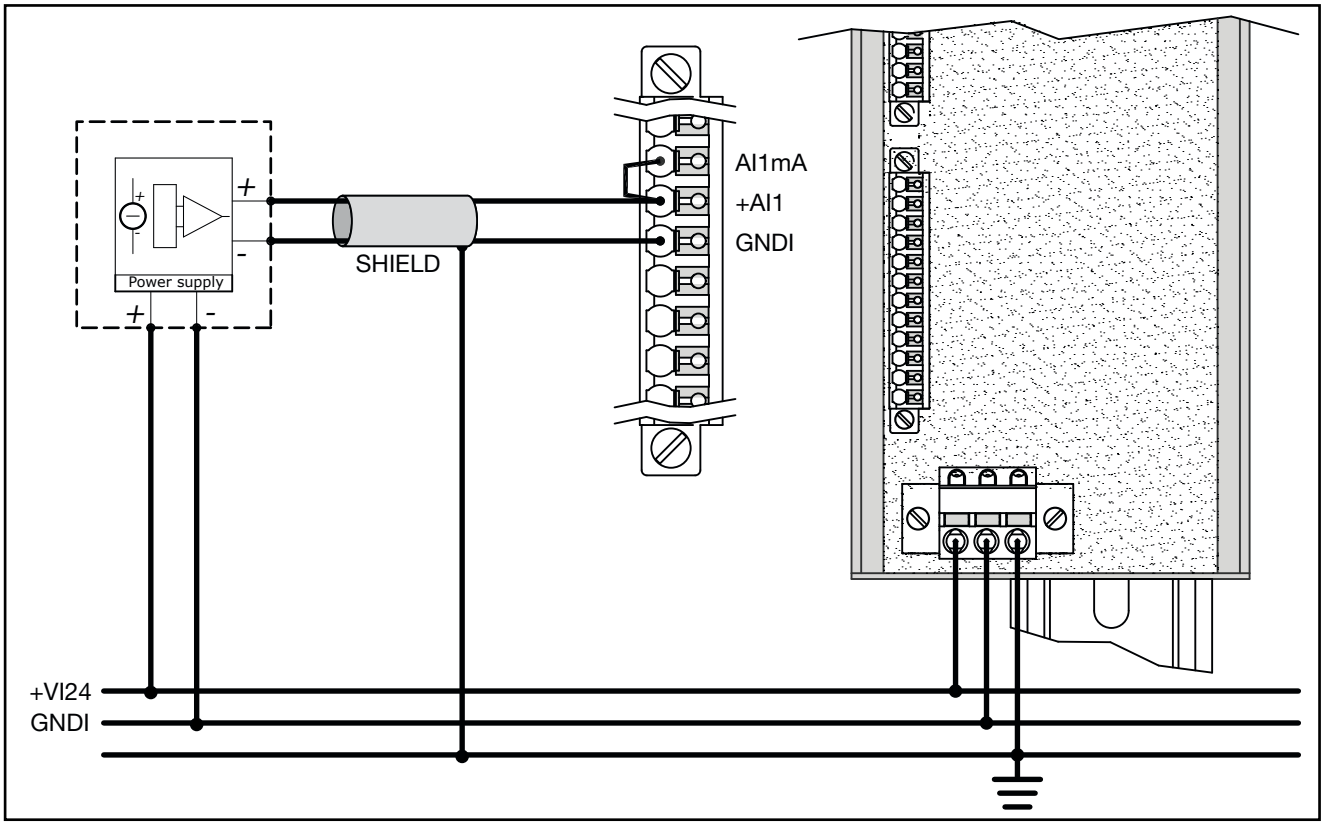
Analogue input in current – 2-wire amplified transducer



Use a screened bipolar cable and connect the screening to the earth bar as close as possible to the module.

Attention: do not forget to bridge the AI1mA port with +AI1.

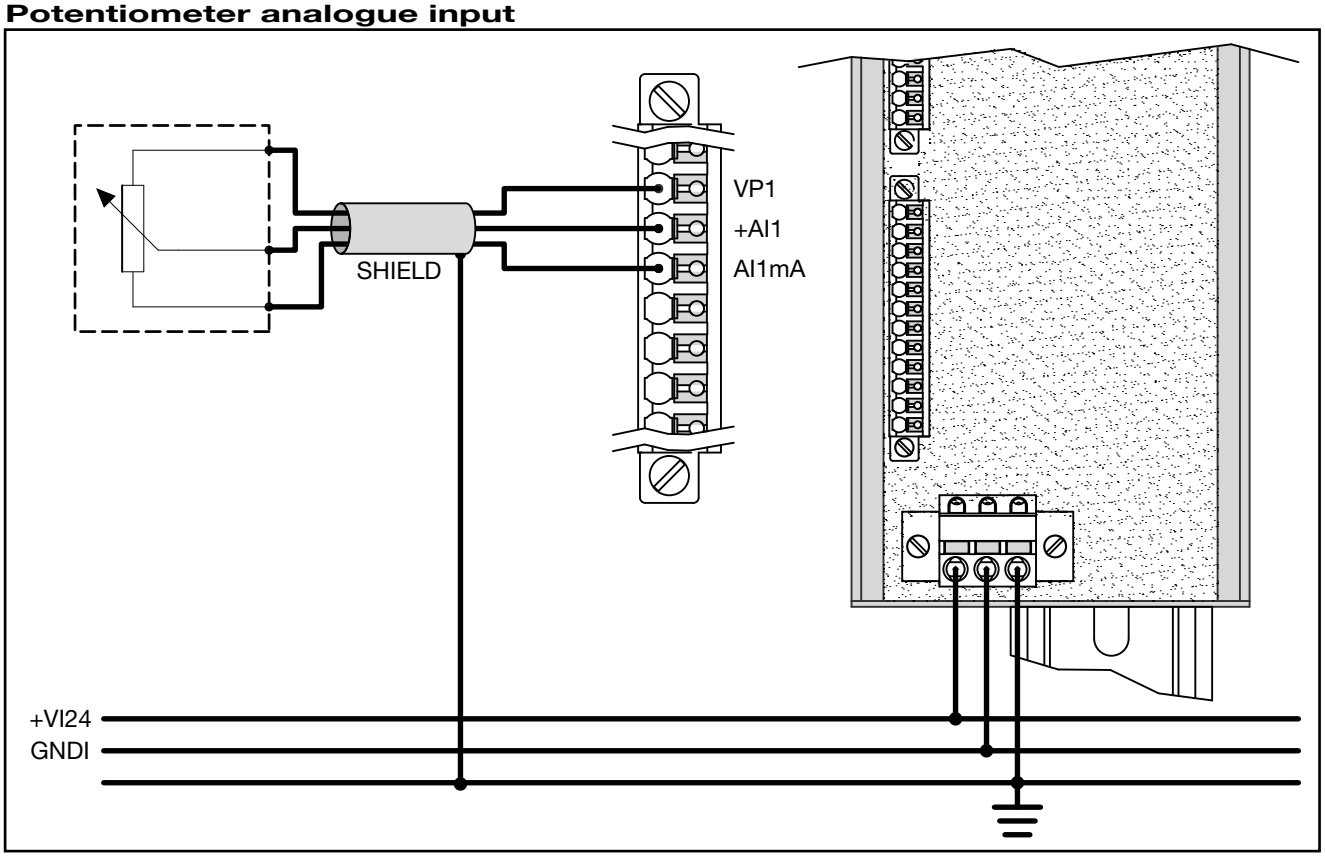
Analogue input in current – 4-wire amplified transducer



Use a screened bipolar cable and connect the screening to the earth bar as close as possible to the module.

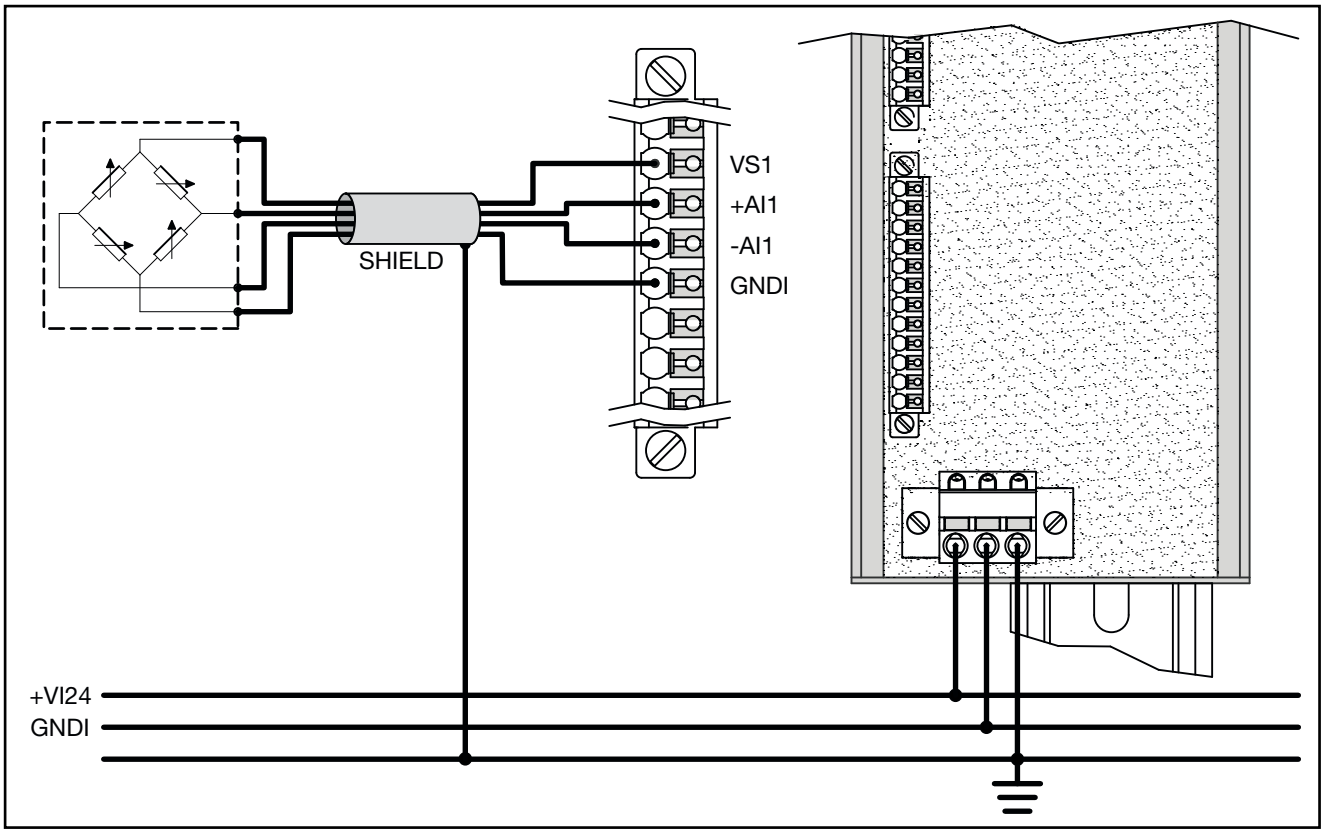
Attention: do not forget to bridge the AI1mA port with +AI1.

Potentiometer analogue input



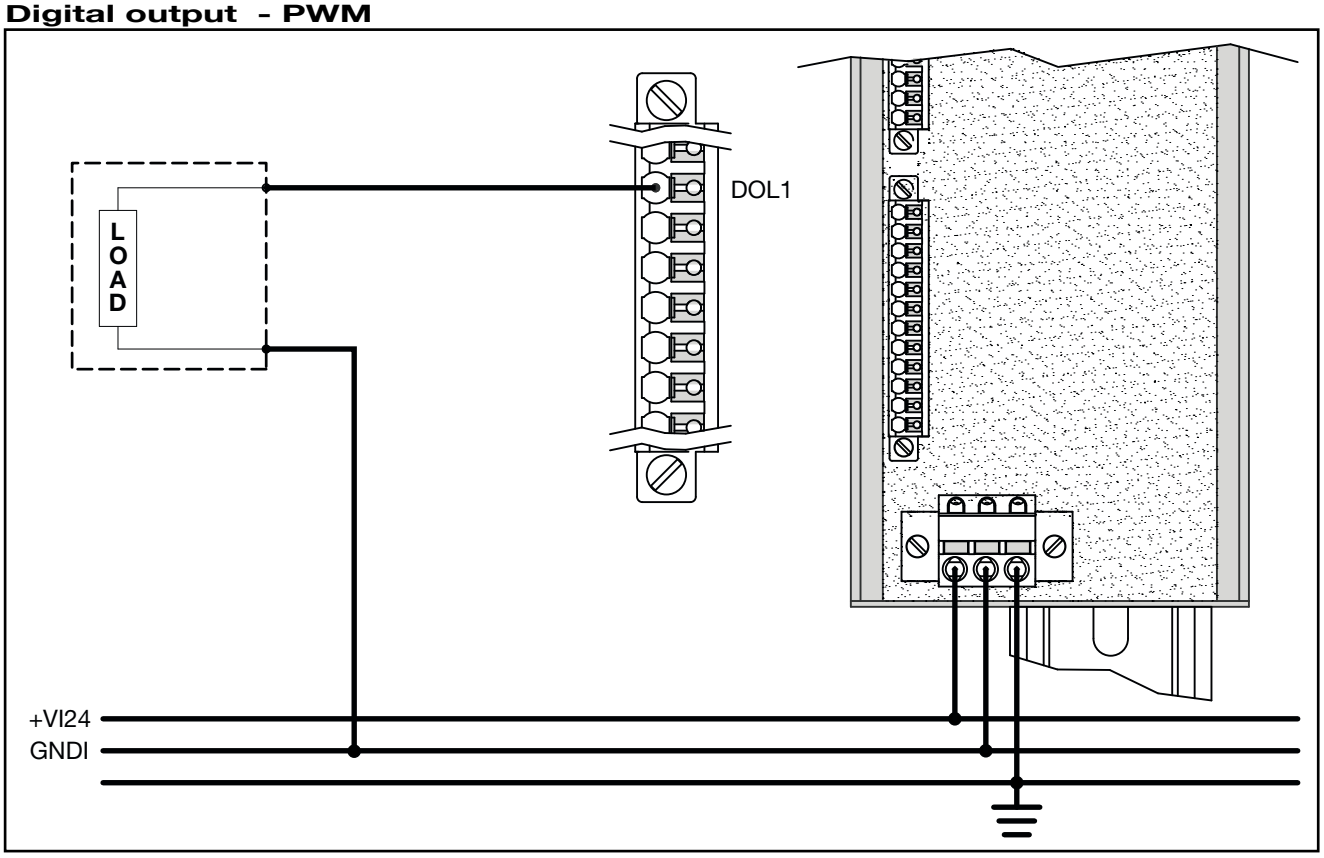
Use a screened cable with 3 conductors and connect the screening to the earth bar as close as possible to the module.
The potentiometer must have a resistance value greater than or equal to 2 kΩ.

Electric resistance extensometer analogue input (“strain gauge”)



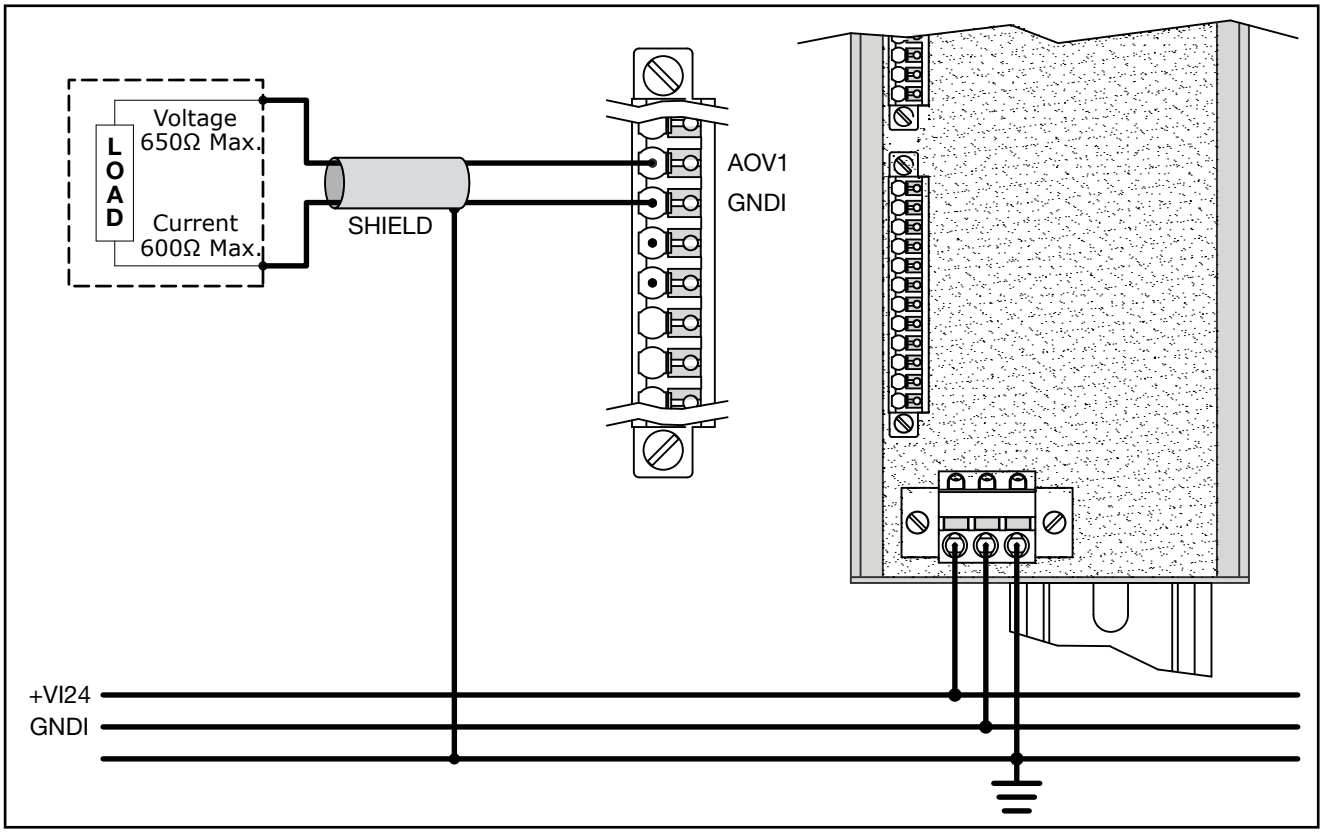
Use a screened cable with 4 or 6 conductors and connect the screening to the earth bar as close as possible to the module.
For the calibration of the transducer, envisage the use of calibration wires outside the module.

Digital output - PWM



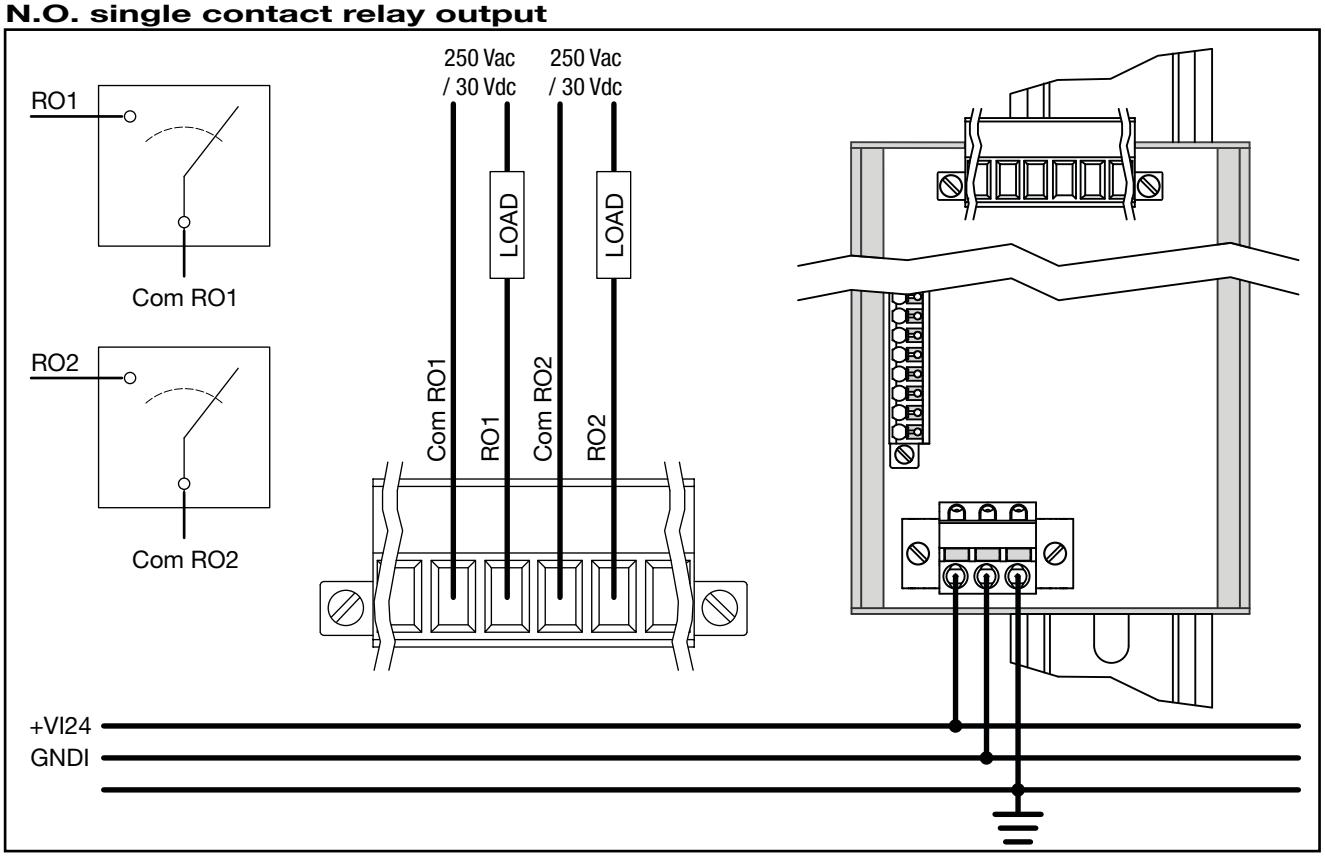
The digital output is available in three versions: 0.5 A, 2 A and PWM, identified respectively as DOLx and DOHx.
Before connecting a charge, check that the Output chosen is adequate. Do not connect charges with higher absorption than that indicated in the technical specifications.

Analogue output in voltage / in current



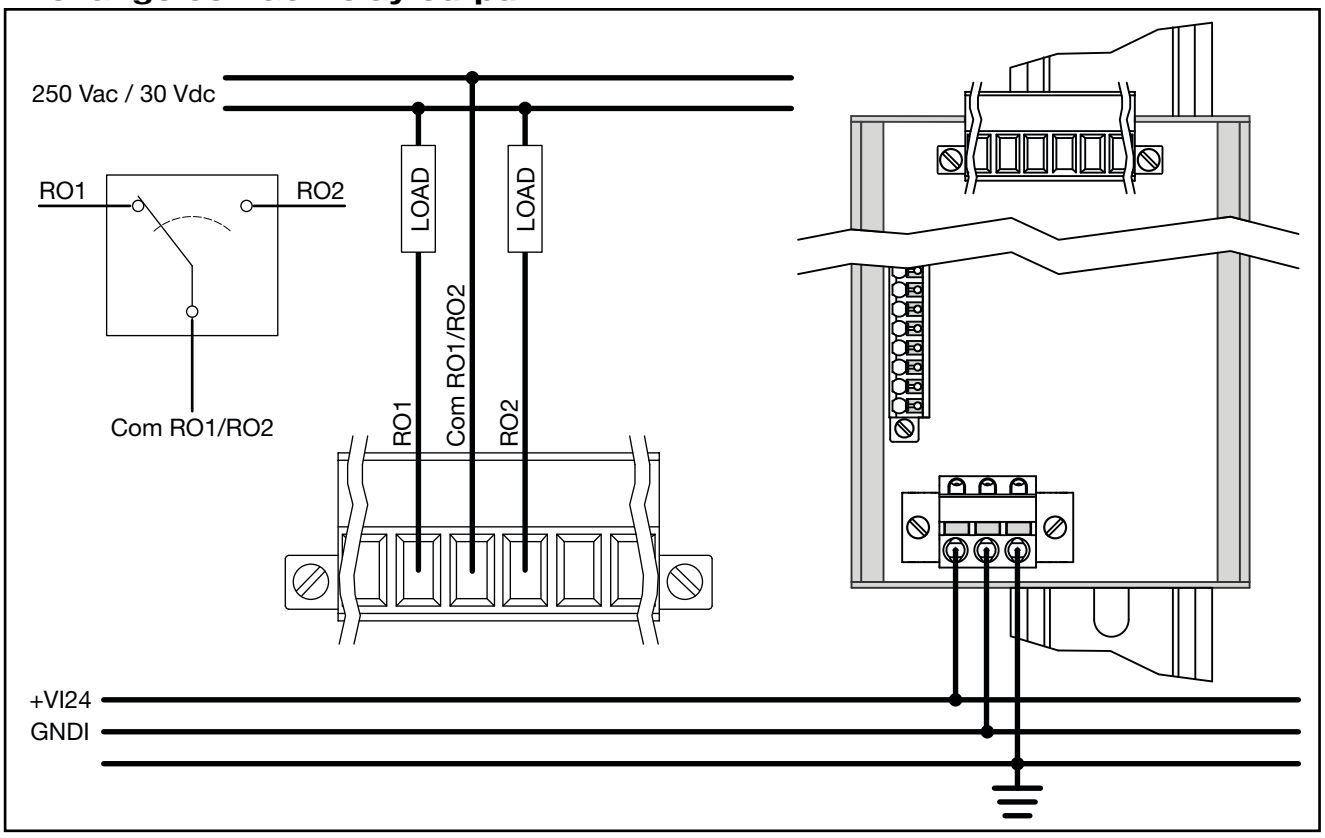
The analogue output is available in two versions: in voltage and in current, identified respectively as AOVx and AOCx.
Do not connect charges that do not fall within the technical specifications. Use a bipolar screened cable and connect the screening to the earth bar as close as possible to the module.

N.O. single contact relay output



Do not connect charges with higher voltage or absorption than that indicated in the technical specifications.

Exchange contact relay output



Do not connect charges with higher voltage or absorption than that indicated in the technical specifications.

Configurations

CAN address

Set the node number of the CAN-IO module with the switch and dials.
The valid addresses range from 1 to 128.

Attention: there cannot be two devices (nodes) with the same address on the CAN bus

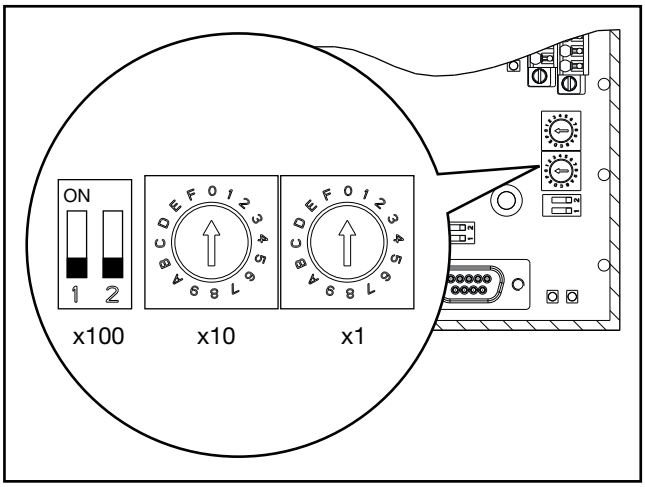


Figure 28 - Address switch and dials

To set an address, proceed as follows:
1. Use switch 2 to select the hundreds (OFF = 0, ON = 1).
2. Use the dial x10 to select the tens (from 0 to 9, A – F positions are not valid).

Attention: selecting position A starts the transmission speed change procedure.

3. Use dial x1 to select the units (from 0 to 9, A – F positions are not valid).

Every change in node number generates a restart of the card with the new address acquired.

Examples of addresses

Address	Switch	Dial x10	Dial x1
8	OFF	0	8
73	OFF	7	3
125	ON	2	5

Setting the transmission speed

The factory configuration envisages a transmission speed of 500 kbit/s.
This speed can be changed from 10 kbit/s to 1000 kbit/s using the two 16-position dials x1 and x10 used to set the CAN address of the CAN-IO module.

The length of the bus network influences the maximum speed reachable, as shown in figure 28.
All the bus network devices have to operate at the same speed.

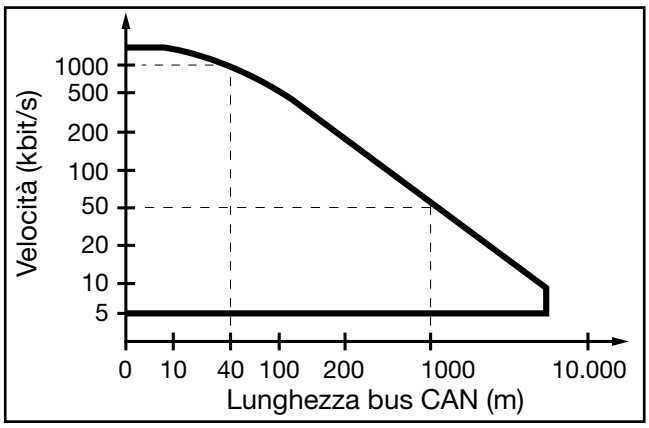


Figure 29 - CAN bus max transmission speed

The possible speed settings are:

Dial position x10	Dial position x1	Transmission speed
A	0	1000 kbit/s
A	1	800 kbit/s
A	2	(pre-set) 500 kbit/s
A	3	250 kbit/s
A	4	125 kbit/s
A	5	100kbit/s
A	6	50 kbit/s
A	7	20 kbit/s
A	8	10 kbit/s

To change the transmission speed, proceed as follows:
1. Set dial x1 to the position corresponding to the transmission speed required.
   The operation of the LEDs of the CAN bus does not change.
2. Set dial x10 to position A.
   The green LED Is permanently on, the red LED is off.
3. The CAN-IO module restarts.
   Wait for about 10 seconds, until the green and red LEDs start to flash.
4. Reset dial x10 to the ten of the node number.
5. Reset dial x1 to the unit of the node number.
6. The CAN-IO module restarts. Wait 10 seconds.
   The transmission speed has been changed.

Example
To set the transmission speed at 250 kbit/s in a CAN-IO module with an address (node number) of 27, take the following steps:
1. Place dial x1 on 3.
2. Place dial x10 on A.
3. Wait for both the green and red LEDs to flash and place the dial x10 on 2.
4. Place dial x1 on 7.
5. Wait for 10 seconds until the CAN-IO module restarts.

La transmission speed can also be changed via software. In this case, sent an SDO command, followed by a reset with an on/off sequence of the CAN-IO module.

Set-up program

When no application program has been uploaded onto the Integrated Controller and Operator Panel, or when the dial is positioned on F, the following happens:

1. The Gefran logo appears on the screen.

2. The operating system is loaded (this takes about 1 minute).
3. The Main Menu of the set-up program appears

The set-up program allows configuration of the device and to obtain information on it.

The configurations to be carried out when using the controller for the first time are:

1. Regulation of the current date and time.
2. Calibration of the touchscreen display.
3. Uploading of the application program.

When uploading an application program onto the controller, the set-up program is no longer shown.

To access the set-up program again after uploading an application program onto the Integrated Controller and Operator Panel, proceed as follows:

1. Switch off the controller.
2. Shift the controller dial to position F (figure 30).

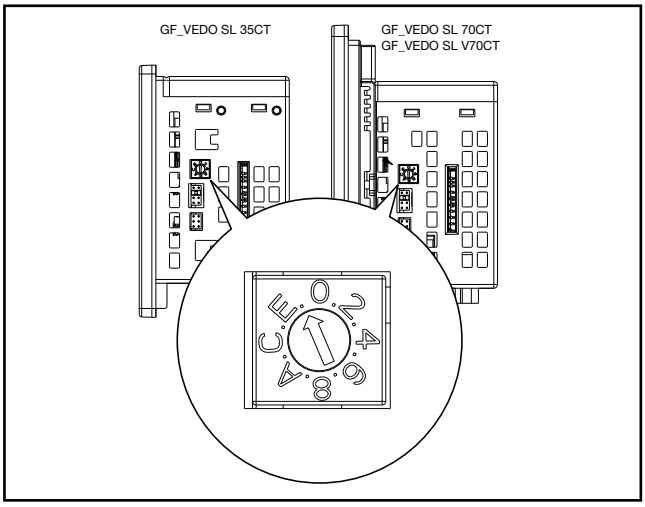
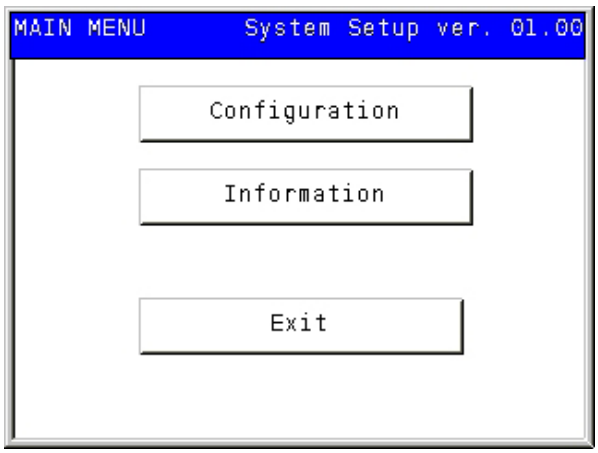


Figure 30 - GF_VEDO SL Dial

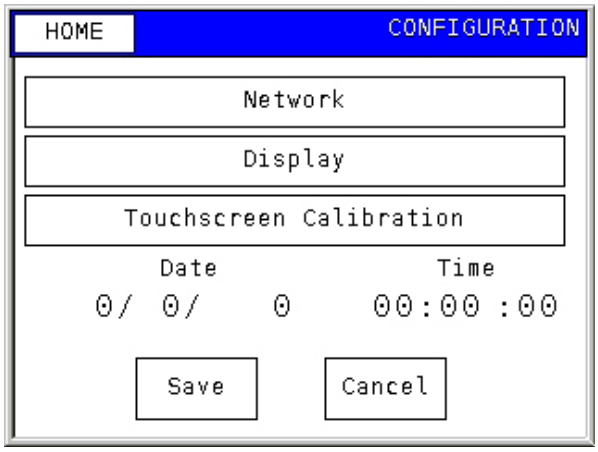
3. Switch the controller on again. After the initial start phase, the main menu of the set-up program appears.
4. Operate as for the set-up program and then switch off the controller
5. Shift the controller dial to its previous position.
6. Switch the controller again. After the initial start phase, the application program screen appears

Main Menu



The version of the set-up program installed appears in the top right corner.
The **Configuration** button allows access to the device configuration procedures.
The **Information** button allows access to information on the firmware and communication protocols installed.
The **Exit** button allows a return to the application program, if installed.

Configuration



The **HOME** button in the top left corner allows a return to the Main Menu.
The **Network** button allows access to the device configuration procedures.
The **Display** button allows access to information on the firmware and communication protocols installed.
The **Touchscreen Calibration** button will allow future access to the procedure for the calibration of the touch screen without using the dial.

To regulate the date, proceed as follows:

1. Touch the year with a finger. The numeric keypad appears. Type in the year and press **Enter** . The changed year appears underlined.
2. Touch the month with a finger. The numeric keypad appears. Type in the month in the 2-figure format and press **Enter**. The changed month appears underlined.
3. Touch the day with a finger. The numeric keypad appears. Type in the day in the 2-figure format and press **Enter**. The changed month appears underlined.
4. Press **SAVE** to save the changes made. When the new date has been saved, the underlining disappears.

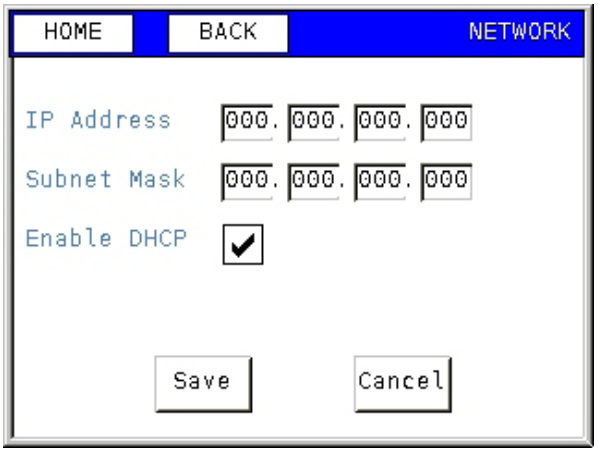
To regulate the time, proceed as follows:

1. Touch the hours with a finger. The numeric keypad appears. Type in the hour in the 24h format and press **Enter** . The changed hour appears underlined.
2. Touch the minutes with a finger. The numeric keypad appears. Type in the minutes in the 2-figure format and press **Enter**. The changed minutes appear underlined.
3. Touch the seconds with a finger. The numeric keypad appears. Type in the seconds in the 2-figure format and press **Enter**. The changed minutes appear underlined.
4. Press **Save** to save the changes made. When the new time has been saved, the underlining disappears.

Attention: the controller does not automatically update the time when the clocks go back/forward.

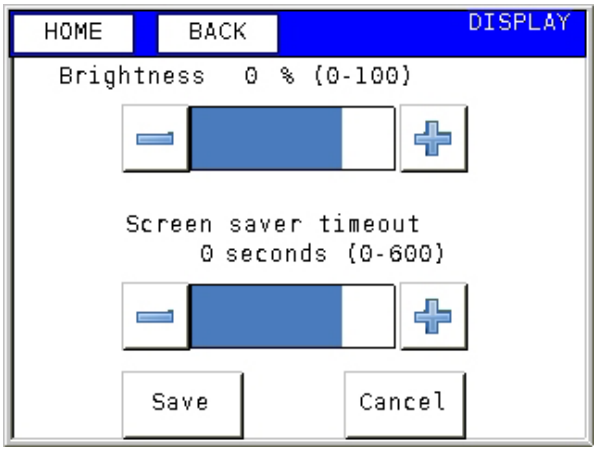
The **Save** button memorises the new time and date and the **Cancel** button cancels the changes and maintains the previous time and date.

Network



On this screen it is possible to know and set the **IP Address** and the **Subnet Mask** of the Integrated Controller and Operator Panel.
Selecting **Enable DHCP** the controller obtains the IP address from a DHCP server connected to the network, otherwise it uses the IP address saved by hand.
The **Save** button memorises the new configuration and the **Cancel** button cancels the changes and maintains the previous configuration parameters.
The **HOME** button in the top left corner allows a return to the Main Menu while the **BACK** button returns to the Configuration screen.

Display



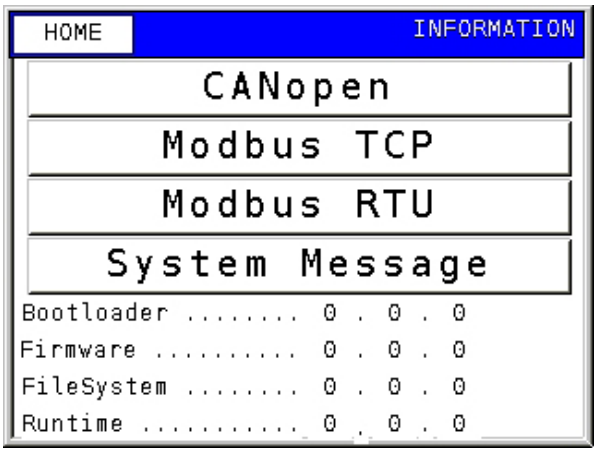
On this screen it is possible to regulate the brightness and the screensaver timeout.
To regulate the **Brightness** of the screen, use the **-** and **+** buttons. The 100% value (set in the factory) is ideal for most situations.
To regulate the **Screen saver timeout** use the **-** and **+** buttons. 120 seconds (set in the factory) is ideal for most situations. Setting 0 seconds, the screen never times out. It is advisable to set the shortest possible timeout, compatibly with your needs. To see the screen again, all you have to do is touch any button.
The **Save** button memorises the new configuration and the **Cancel** button cancels the changes and maintains the previous configuration parameters.
The **HOME** button in the top left corner allows a return to the Main Menu while the **BACK** button returns to the Configuration screen.

Touchscreen calibration

To calibrate the touch screen, proceed as follows:

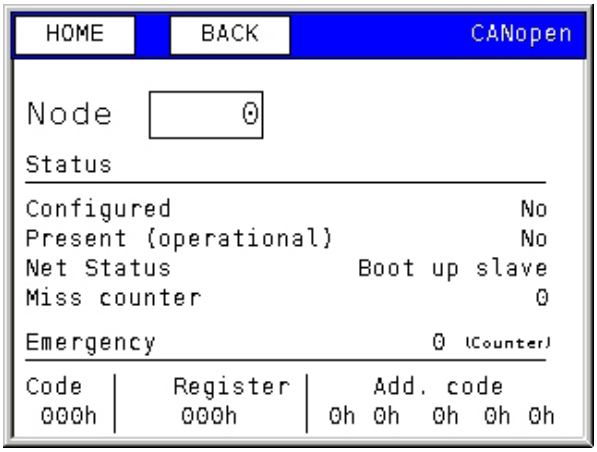
1. Switch off the device.
2. Position the dial on E.
3. Switch the device on again. The logo page is followed by the calibration screen. This screen is used to calibrate the response of the screen when it is touched with a finger.
4. Touch the 5 targets precisely with a plastic tip, following the order proposed on the screen.
5. After touching the 5th target, the system automatically exits the calibration procedure and starts the set-up program or, if it exists, the application program.
6. Switch off the device.
7. Position the dial on 0.
8. Switch the device on again.

Information



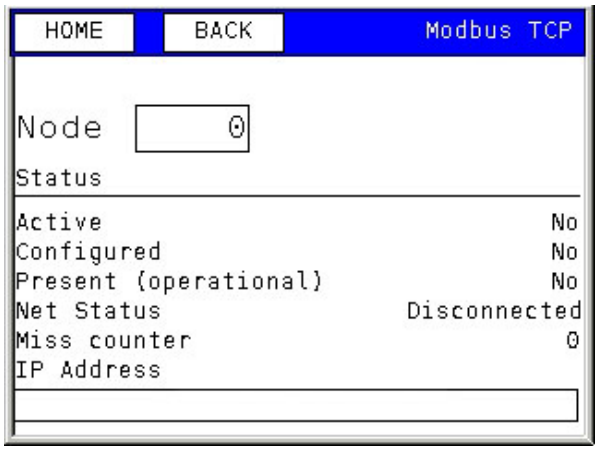
The **HOME** button in the top left corner allows a return to the Main Menu.
The **CANopen**, **Modbus TCP** and **Modbus RTU** buttons allow access to information relating to the various communication protocols.
The **System Message** button allows access to system information.
The screen directly shows the versions of Bootloader, Firmware, FileSystem and Runtime.

CANopen



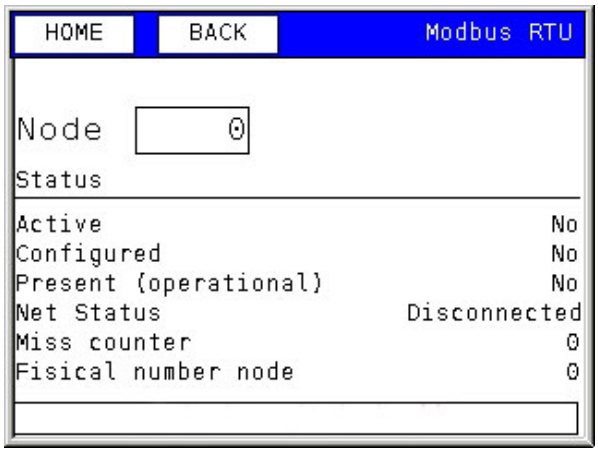
This screen shows the node number of the Integrated Controller and Operator Panel for the CANopen protocol and information on the status of the CANopen protocol.
Emergency information defines the number of times that the node has shown the state of emergency.
The **HOME** button in the top left corner allows a return to the Main Menu while the **BACK** button returns to the Information screen.

Modbus TCP



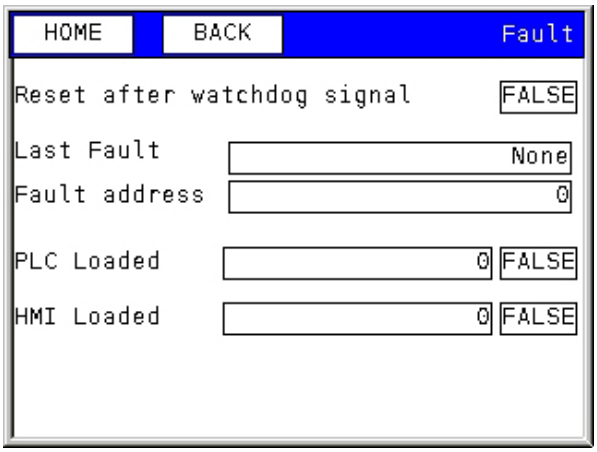
This screen shows the **Node** number of the Integrated Controller and Operator Panel for the Modbus TCP protocol and information on the status of the Modbus TCP protocol.
The **HOME** button in the top left corner allows a return to the Main Menu while the **BACK** button returns to the Information screen.

Modbus RTU



This screen shows the **Node** number of the Integrated Controller and Operator Panel for the Modbus RTU protocol and information on the status of the Modbus TCP protocol.
The **HOME** button in the top left corner allows a return to the Main Menu while the **BACK** button returns to the Information screen.

System Message / Fault



This screen shows useful information in the case of malfunctions.
Reset after watchdog signal signal indicates whether the controller restarts automatically after the program has been blocked.
Last Fault indicates when the last malfunction occurred.
Fault address indicates the address of the application program code which manifested the malfunction.
PLC Loaded shows and signals the correct upload of the PLC software.
HMI Loaded shows and signals the correct upload of the application program.
The **HOME** button in the top left corner allows a return to the Main Menu while the **BACK** button returns to the Information screen.

Uploading the application program

To upload the application program onto the Integrated Controller and Operator Panel, proceed as follows:

1. Connect the controller to a PC using a crossover Ethernet cable.
2. Open the Network screen of the set-up program, disable the DHCP and manually set an IP address, e.g.: 192.168.010.002.
3. Run the *GF Project LX* program on the PC.
4. Click the **Open code prj ...** button
5. Select the required PLC program from the list that opens (the file extension is .PPJS) and click the **Open** button.
6. Select -> **Settings** from the **Communication** menu.
7. Select the **GDB** protocol in the **Device Link Manager Config** window that opens.
8. Click the **Properties** button. The **Gdb Config**. window opens. Select the **TCP/IP** protocol from the **Port** dropdown menu and enter the IP address indicated at step 2 of the procedure in the IP address box.
9. Click the **OK** button and then press **OK** again.
10. Check the connection. **Select -> Connect** from the Connection menu. The PC connects to the controller. In the bottom right window the following words appear: **CONNECT**, in green, **NO CODE** in yellow. If **DIFFERENT CODE** appears, this means that there is already an application program, different from the one you are trying to upload, on the controller. If the word **CONNECT** does not appear, this means that communication related settings are incorrect. In particular, verify the IP address
11. Upload the application onto the controller, selecting -> **Download Code** from the **Communication** menu. Click the **Yes** button in the warning message that opens. The transfer starts and is highlighted on a progress bar.
12. At the end of the transfer, a window opens and asks you to restart the system. Click **Yes**.
13. In the bottom left corner of the ***Output*** panel there is a list of the results of the actions performed; the message **SOURCE OK** appears in the window at the bottom.
14. Click the **Open GF Project LX page** button and wait for the page editor to open.
15. Open the page application, selecting the **OPEN page** menu.
16. Select the page required (the file extension is PAJX) from the list and click the **Open** button.
17. Select -> **Communication settings** from the **Project** menu.
18. Select the **GDB** protocol in the **Device Link Manager Config** window that opens.
19. Click the **Properties** button. The **Gdb Config**. window opens. Select the **TCP/IP** protocol from the Port dropdown menu and enter the IP address indicated at step 2 of the procedure in the **IP address** box.
20. Clic the **OK** button and then press **OK** again.
21. Transfer the program, selecting **Download Project** from the **Project** menu.
22. In the bottom left corner of the ***Output*** panel there is a list of the results of the actions performed; and the first page of the program uploaded appears on the screen of the Integrated Controller and Operator Panel.
23. Remove the Ethernet cable.

To upload a new program onto a controller that has already been programmed, follow the same procedure.

MAINTENANCE AND DIAGNOSTICS

Maintenance

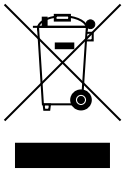
Integrated Controller and Operator Panel

To clean the screen use a slightly damp soft cloth.
Do not use chemical or abrasive products.
Disconnect the power supply before cleaning the Controller.

CAN-IO Module

The CAN-IO module requires no maintenance.

Disposal



The Integrated Controller and Operator Panel and the CAN-IO module must be disposed of in compliance with the laws in force.
Some of the components used in the devices may damage the environment unless disposed of properly.

Diagnostics

Integrated Controller and Operator Panel

See the System Message screen of the set-up program.

CAN-IO Module

Should a CAN-IO malfunction, it is possible to gain information on the status of the device and its components from the LEDs.

LED	Control	Meanings	Possible actions
Power (yellow)	Power	ON: module powered	
		OFF: no power	Check that there are 24 Vdc at the glands of the power terminals and that the polarities are correct
Run (green)	Card status	ON: card working	
CAN Run (verde)	CAN status	ON: “OPERATIONAL” status	
		OFF: “INIT” status (system configuration)	If the LED remains off, the device is broken
		Flashing: the device is in “PREOPERATIONAL” status	
		Single flash: the device is in “PREPARED” (or “STOPPED”) status	
CAN Fail (red)	CAN operation	OFF: no error, the device works perfectly	
		ON: the CAN controller is in Bus Off. No communication is possible	Check the CAN line connections
		Single flash: the CAN controller error counters has reached “Warning” level	Check the CAN line connections and terminations

ORDERING CODE

Integrated Controller and Operator Panel

Create the codes to suit the device configuration required

GF_VEDO SL #### LX0 ## ## ## ## #

Model	
3.5” display	**35CT**
7” horizontal display	**70CT**
7” vertical display	**V70CT**

Basic memory	
FLASH 128 MB DRAM 64 MB FRAM 32 kB **(1)**	**LX0**

RS485 + RS232 Ports		
Absent	**00**	
serial RS485+RS232+slot SD card	**S1**	**1)**

CAN Port		
Absent	**00**	
CANopen	**C1**	**3)**

USB Port	
Absent	**00**
USB	**U1**

Keypad	
Absent	**00**
Present	**K1**

Lexan		
Gefran	**G**	
Open Frame	**0**	
Custom	**C**	**2)**

(1) SD and FRAM Available from January 2013
(2) Ask for availability
(3) Mandatory port for use with remote IO

Code examples

GF_VEDO SL 70CT LX0 S1 C1 U1 00 G 7” display; CANopen, RS485, RS232 and USB ports; lexan Gefran; no keypad

GF_VEDO SL 35CT LX0 00 C1 U1 K1 C 3,5” display; CANopen and USB ports; lexan customized; 6-key keypad

CAN-IO

Create the codes to suit the device configuration required

CAN-IO-D ## # ## ## ## # **A** # # # # ## ## ## # # - # # #

Digital IO

Digital inputs (max 24)	
+24 VDC	**00 / 03 / 06 / 09 / 12 / 15 / 18 / 21 / 24**

Fast counters (max 6)	
Contatore veloce 50 kHz	**0 / 3 / 6**

Digital outputs (max 16)	
+24 VDC 0,5 A	**00 / 02 / 04 / 06 / 08 / 10 / 12 / 14 / 16**
+24 VDC 2 A	**00 / 02 / 04 / 06 / 08 / 10 / 12 / 14 / 16**
Relè, 250VAC 5 A	**0 / 2 / 4 / 6 / 8**

PWM outputs (max 8)	
24 VDC 1 A, xxxx kHz max	**0 / 2 / 4 / 6 / 8**

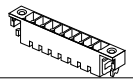
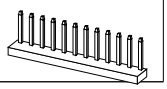
Analogue IO

Analogue inputs (max 8)	
±10 V	**0 / 2 / 4 / 6 / 8**
0-20 mA	**0 / 2 / 4 / 6 / 8**
Strain gauge 3,3mV/V	**0 / 2 / 4 / 6 / 8**
Potentiometer	**0 / 2 / 4 / 6 / 8**

Temperature inputs (max 10)	
Thermocouples J, K, S, N, T, E, B, R	**00 / 02 / 04 / 06 / 08 / 10**
Pt100	**00 / 02 / 04 / 06 / 08 / 10**
Pt1000	**00 / 02 / 04 / 06 / 08 / 10**

Analogue inputs (max 8)	
±10 V	**0 / 2 / 4 / 6 / 8**
0-20 mA	**0 / 2 / 4 / 6 / 8**

Phisical characteristics

Connector		
1	Screw terminals	
2	Click, female, 12-pole	
3	Comb	

IP protection rating	
0	Absent
1	IP20

DIN runner	
0	Absente
1	Present

ATTENTION! The total number of inputs and Outputs cannot be more than 40.

Code examples

CAN-IO-D 09 3 00 00 00 4 A 0 0 0 0 00 00 00 0 0 - 0 0 2
CAN-IO-D 00 0 00 00 04 0 A 0 0 0 2 04 00 00 0 2 - 1 1 1

9 digital inputs, 3 fast counters, 4 PWM outputs; assembly on plate; click connectors
4 relay outputs, 2 potentiometer inputs, 4 thermocouple inputs, 2 current analogue outputs 0-20 mA; assembly on DIN runner; IP20 protection rating; screw terminals

Accessories

Ordering code		Description	Quantity per pack
		Female fly connector, 12-pole, for type 2 module connector	10
		Female fly connector, for type 3 module connector	10

Programming tool

GF_PROJECT LX

Development software that allows the writing of the application program for PLC with IEC1131 languages. Also allows the construction, in graphic mode, of the various pages of the user interface necessary to the application developed.
Via GF_PROJECT LX it is possible to connect to the device that will host the application to debug the program and upload the upgrades.

System requirements

	Minimum	Recommended
Operating system	Windows XP SP2 or Windows Vista or Windows 7 (32 bit)	Windows 7 (64 bit)
Processor	Intel Pentium 1 GHz	Intel Core i5 2,5 Ghz or superior
RAM	2 GB	4 GB or superior
Free space on Hard Disk	2 GB	4 GB or superior
Graphic resolution	XGA (1024 x 768 pixel)	SXGA (1280 x 1024 pixel) or superior
Browser	Microsoft Internet Explorer 8.0	Microsoft Internet Explorer 9.0 or superior
Ethernet port	1 RJ45	
DVD player	Yes	
USB port		1 USB 2.0

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